

Efficacy of Supplementation of Fish Oil and Impact of Nutrition Counselling on Anthropometric and Clinical Profile of at Risk Heart Subjects

Navjot Kaur, Paramjit Chawla and J.K. Sangha

*Department of Foods and Nutrition, Punjab Agricultural University,
Ludhiana 141 004, Punjab, India*

KEYWORDS Anthropometry. Clinical Profile. Fish Oil. Nutrition Counselling

ABSTRACT Sixty males belonging to middle and high socio-economic status, who were at risk of developing coronary heart disease were selected. The study was conducted in three phases. In phase I, anthropometric parameters, blood glucose, blood pressure and blood lipids of subjects was recorded. Subjects were followed for one month and no treatment was given except prescribed medicines and was treated as self control. At one month interval, above parameters were again recorded and subjects were divided into two groups of 30 each. In phase II, supplementation with fish oil capsules seven seas sea cod 300 mg thrice a day was done in group I and nutrition counselling regarding heart and its related risk factors, dietary factors with special emphasis on use of fish (100g) and raw garlic (1-4 cloves) in daily diet was imparted for a period of 2 months in group II. There was significant decrease in weight, body mass index, waist to hip ratio, mid upper arm circumference, triceps skinfold thickness, systolic blood pressure, diastolic blood pressure, blood glucose, low density lipoprotein cholesterol, very low density lipoprotein cholesterol and triglycerides and significant increase in high density lipoprotein cholesterol in both fish oil supplementation and nutrition counselling group. Percentage decrease was however more in nutrition counselling group as compared to fish oil supplementation group indicating that inclusion of fresh raw garlic (1-4 cloves/day) and 100g of low fat fish on daily basis is better alternative in mitigating the risk of coronary heart disease.

INTRODUCTION

Coronary heart disease one of the rapidly spreading diseases world wide is assuming grave proportions, particularly in India, cutting across age group, class and strata of society. As many as 30 million people in India currently suffer from heart disease. By 2010, hundred million Indians are expected to be suffering from this silent disease and by 2020 India will have the largest cardiovascular disease burden in the world. Judicious selection of cardioprotective foods is must in such situation. Fish oil is an abundant source of n-3 polyunsaturated fatty acids mainly eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) that lowers blood cholesterol, decrease fibrinogen levels, inhibit the activity of platelets, clotting process and triglycerides. Diets rich in herbs and spices mainly raw garlic are also associated with lower risk. Garlic lowers LDL-C, triglycerides, blood pressure, keeps blood thin, reduces the risk of blood clots and function as an antioxidant. Nutrition counselling based on dietary modifications if implemented can decrease the morbidity associated with heart disease. Therefore, the present study was planned with following objective:

To study the effect of fish oil supplementation and nutrition counselling with special emphasis on intake of fish and raw garlic on anthropometric and lipid profile of at risk heart subjects.

MATERIAL AND METHODS

Sixty males belonging to middle and high socio economic status aged 30-50 years and who were at risk of developing coronary heart disease were selected. Study was conducted in three phases. In Phase I - anthropometric parameters i.e. height, weight, mid upper arm circumference (MUAC), triceps skinfold thickness (TSFT), waist and hip were measured by standard methods given by Jelliffe (1966). Systolic and diastolic blood pressure were recorded and blood samples were drawn to analyse blood glucose, total cholesterol, high density lipoprotein cholesterol (HDL-C) and triglycerides (TG). On basis of these body mass index (BMI), waist to hip ratio (W:H), low density lipoprotein cholesterol (LDL-C) and very low density lipoprotein cholesterol (VLDL-C) were calculated. Subjects were followed for one month and no treatment was given except prescribed medicines and were treated as self control. At one month

interval, above parameters were again recorded and subjects were divided into two groups of 30 each. In phase II, supplementation with fish oil capsules seven seas sea cod 300 mg thrice a day was done in group I and nutrition counselling regarding heart and its related risk factors, dietary factors with special emphasis on use of fish (100g) and raw garlic (1-4 cloves) in daily diet was imparted for a period of 2 months in group II through lectures, discussions, floppies, charts and posters. In phase III, information on the parameters as in phase I was again recorded.

RESULTS AND DISCUSSION

The effect of fish oil supplementation and nutrition counselling on anthropometric measurements is depicted in Table 1. The mean weight of subjects at baseline was 79.60 and 80.43 kg. Percentage decline was 3.60 in first group and 4.30 in second group. Lauber and Sheard (2001) reported that weight loss of approximately 5-10 of body weight has shown to reduce the risk of

heart disease. Percentage decrease in BMI was 3.61 in group I and 4.57 in group II. At baseline W:H of subjects in both groups was 0.895 and 0.866. A significant decrease was seen in both group and W:H was 0.875 and 0.836 at the end of study. Seidell *et al* (2001) reported that 0.15 increase in W:H has been correlated with 60 per cent increase in risk of death from coronary heart disease. Percentage decline in MUAC and TSFT in group I was 2.85 and 1.82 and in group II was 5.81 and 6.57. Takami *et al* (2001) reported that TSFT and MUAC are strong predictors of heart disease. Significant decrease in systolic and diastolic blood pressure was also observed in both groups (Table 2). Hisoyasu (2001) reported fish oils are protective against coronary heart disease by lowering blood pressure. Significant decrease in blood glucose was also seen in both the groups, owing to consumption of fish oils in group I and due to increased intake of n-3 fatty acids from fish, fibre from whole grain cereals, antioxidants from fruits and vegetables in group II. Significant decrease in total cholesterol was

Table 1: Effect of fish oil and nutrition counselling on anthropometric measurements of the subjects (mean±S.E.)

Parameters	Group I Fish oil supple- mentation ($n_1 = 30$)	Group II Nutrition counselling ($n_2 = 30$)	F-ratio	C.D.	Std range
Height (cm)					
Baseline	172.10±6.49	169.13±5.34	3.26	1.7840	-
After Exp.	172.10±6.49	169.13±5.34	3.26	1.7840	-
Paired t-value	-	-			
Weight (kg)					
Baseline	79.60±2.04	80.43±1.96	0.65	NS	60
After Exp.	76.73±2.12	76.97±1.54	0.17	NS	-
Paired t-value	12.82***	2.84***			
BMI (kg/m²)					
Baseline	26.84±0.62	28.19±0.67	2.09	NS	18.5 -
After Exp.	25.87±0.66	26.90±0.59	0.89	NS	25
Paired t-value	12.97***	3.26***			
Waist: Hip					
Baseline	0.895±0.02	0.866±0.007	1.77	NS	0.8 - 1 ^ε
After Exp.	0.875±0.02	0.836±0.007	1.92	NS	
Paired t-value	10.74***	6.05***			
MUAC (cm)					
Baseline	31.51±0.77	30.79±0.54	4.18	1.9437	32.2
After Exp.	30.61±0.78	29.00±0.40	4.04	1.8526	
Paired t-value	16.34***	6.20***			
TSFT (mm)					
Baseline	23.04±0.76	23.13±0.44	2.33	NS	12.5
After Exp.	22.62±0.89	21.61±0.46	2.88	NS	
Paired t-value	1.12 ^{NS}	3.32***			

^εGhafforunissa and Krishnaswamy (1998)

NS Non significant

***Significant at 1 per cent level

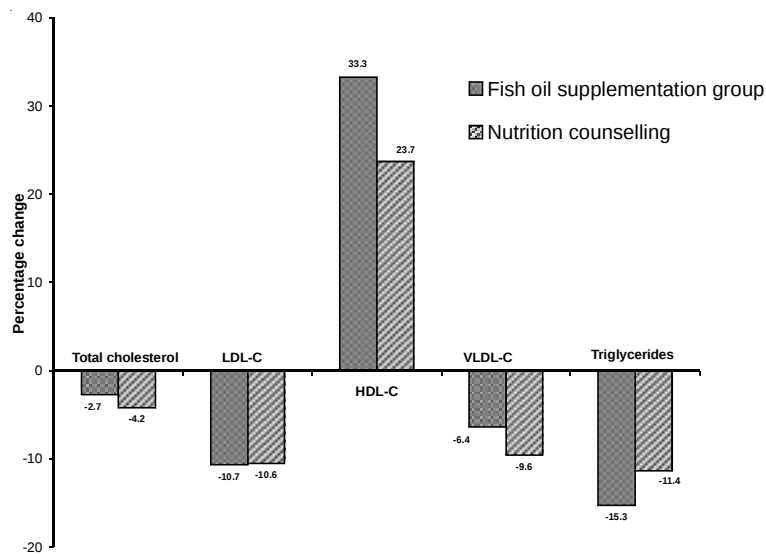
Table 2: Effect of fish oil and nutrition counselling on blood pressure and blood glucose of the subjects (mean±S.E.)

Parameters	Group I Fish oil supplementation ($n_1 = 30$)	Group II Nutrition counselling ($n_2 = 30$)	F-ratio	C.D.	Std. range
Systolic BP (mmHg)					
Baseline	143.50±3.99	140.33±3.78	3.61	10.8653	
After Exp.	130.00±2.09	125.67±2.61	15.41	7.3983	
Paired t-value	6.25***	5.40***			<140
Diastolic BP (mmHg)					
Baseline	94.17±1.48	90.50±2.05	0.87	NS	90
After Exp.	88.00±1.22	82.67±1.07 ^a	4.67	3.5757	
Paired t-value	3.98***	3.54			
Blood glucose (mg/100ml)					
Baseline	119.43±5.53	114.00±5.06	0.51	NS	120
After Exp.	106.67±4.31	107.30±5.37	0.09	NS	
Paired t-value	3.32***	4.92***			

Ghafforunissa and Krishnaswamy (1998)

NS Non significant ** Significant at 5 per cent level *** Significant at 1 per cent level

^asignificant difference between group I and II

**Fig. 1. Effect of fish oil supplementation and nutrition counselling on lipid profile of the subjects**

also seen in both the groups (Table 3) with percentage decline of 2.74 in group I and 4.23 in group II (Fig. 1). Amirthaveni and Vijayalakshmi (2003) reported that supplementation of max capsules containing 1.7g of EPA and 1.2g of DHA by 70 patients for 2 months significantly lowered mean total cholesterol from 266.3 mg/dl to 231.4 mg/dl. Ali and Thomson (1995) reported that raw garlic in an amount equal to one half to one fresh clove/ day decrease total cholesterol by 9 per cent. Significant decrease in LDL-C and VLDL-C

was also observed in both the groups. Mean values of HDL-C increased from 42.22 to 56.27 in group I and 40.19 to 49.72 mg/100 ml in group II. Mean values of triglycerides decreased from 202.12 to 171.20 in first group and 194.27 to 172.70 mg/100 ml in group II. Sandhu *et al* (2005) also reported a decrease in TG levels from 149.1 to 137.8 mg/100 ml after conducting nutrition intervention trial for a period of 6 months.

Results of present study shows that there was significant decrease in weight, body mass

Table 3: Effect of fish oil and nutrition counselling on lipid profile of the subjects (mean±S.E.)

Parameters	Group I Fish oil supplementation (n ₁ = 30)	Group II Nutrition counselling (n ₂ = 30)	F-ratio	C.D.	Std. range
Total cholesterol (mg/100 ml)					
Baseline	262.20±12.22	225.25 ±7.60 ^a	3.83	11.0631	<200
After Exp.	255.01±11.12	215.71±5.86	4.72	16.2357	
Paired t-value	2.41**	3.61***			
LDL-C (mg/100 ml)					
Baseline	168.13±9.37	138.09±5.00 ^a	4.51	19.8905	<130
After Exp.	150.13±8.15	123.51±4.40	6.15	18.1502	
Paired t-value	6.78***	7.79***			
HDL-C (mg/100 ml)					
Baseline	42.22±1.86	40.19±1.30	0.94	NS	>50
After Exp.	56.27±1.24	49.72±1.24 ^a	10.54	3.5349	
Paired t-value	7.90***	7.20***			
VLDL-C (mg/100 ml)					
Baseline	51.93±3.94	46.97±2.36	0.67	NS	<40
After Exp.	48.61±3.64	42.48±2.39	1.00	NS	
Paired t-value	7.04***	6.98***			
Triglyceride (mg/100 ml)					
Baseline	202.13±9.80	194.27±10.79	0.20	NS	<150
After Exp.	171.20±7.53	170.20±9.40	0.34	NS	
Paired t-value	8.92***	8.48***			

National Cholesterol Education Programme (2001)

NS Non significant ** Significant at 5 per cent level ***Significant at 1 per cent level

^asignificant difference between group I and II

index, waist to hip ratio, mid upper arm circumference, triceps skinfold thickness, systolic blood pressure, diastolic blood pressure, blood glucose, low density lipoprotein cholesterol, very low density lipoprotein cholesterol and triglycerides and significant increase in high density lipoprotein cholesterol in both fish oil supplementation and nutrition counselling group. Percentage decrease was however more in nutrition counselling group as compared to fish oil supplementation group indicating that inclusion of fresh raw garlic (1-4 cloves/day) and 100g of low fat fish on daily basis is better alternative in mitigating the risk of coronary heart disease.

REFERENCES

- Ali, M. and Thomson, M.: Consumption of garlic clove a day could be beneficial in preventing thrombosis. *Prost. Leuk. Ess. Fatty Acids*, **53**: 211-212 (1995).
- Amirthaveni, M. and Vijayalakshmi, P.: Effect of fish oil supplementation on hyperlipidemic patients. *Ind. J. Nutr. Diet.*, **40**: 78-83 (2003).
- Ghafoorunissa and Krishnaswamy (Ed.): *Diet and Heart Disease*. pp 21-62. NIN, Hyderabad, (1998).
- Hisoaya, I: Intake of fish and omega-3 fatty acids and risk of stroke in women. *JAMA*, **285**: 304-312 (2001).
- Jelliffe, D.B.: *The Assessment of the Nutritional Status of the Community*. Monograph Series No. 53, World Health Organisation, Geneva (1966).
- Lauber, R.P. and Sheard, N.F.: The American Heart Association Dietary Guidelines for 2000: A Summary Report. *Nutr. Rev.*, **59**: 298-306 (2001).
- National Cholesterol Education Program (NCEP): Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. *Third Report (Adult Treatment Panel III)*. *JAMA*, **285**: 2486-97 (2001).
- Sandhu, N., Sangha, J. and Sachdeva, R.: Efficacy of nutrition intervention on the anthropometric and blood profile of at risk coronary heart disease subjects. *J. Res.*, **42**: 98-103 (2005).
- Seidell, J.C., Perusser, L., Despres, J.P. and Bouchard, C.: Waist and hip circumference have independent and opposite effect on cardiovascular disease risk factors: The Quebec family study. *Am. J. Clin. Nutr.*, **74**: 315-321 (2001).
- Takami, R., Takeda, N., Hayashi, M. and Yasuda, M.: Body fatness and fat distribution as predictors of metabolic abnormalities and early carotid atherosclerosis. *Diabetes Care*, **24**: 1248-1252 (2001).