EFFECTS OF ASTAXANTHIN ON CARDIO-METABOLIC RISK FACTORS IN THE PEDIATRIC AGE GROUPS

Maryam Aref,Dr Roya Kelishadi,Dr motahar Heydari bani,Dr Ariyo Movahedi

Introduction

The prevalence of obesity is increasing in pediatric age groups and it is considered as public health problem. Several cardiovascular risk factors such as metabolic syndrome are closely associated with obesity. Cardio-metabolic risk factors including abnormal levels of lipid profile, blood sugar and blood pressure during childhood can raise mortality rates in adulthood.

Healthy life style is the best way for prevention of cardio-metabolic risk factors. However, some nutritional supplements are recommended for prevention or treatment of cardio-metabolic risk factors [1-3].

This study aims to investigate the effects of shrimp oil supplementation on cardio-metabolic risk factors in overweight and obese children and adolescents.

Introduction

Shrimp oil contains n-3 fatty acids such as docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA). It also contains a large amount of polyunsaturated fatty acids (PUFAs) as well as carotenoids, e.g. β-carotene and astaxanthin (ASX) [4].

One of the most important components of shrimp oil is ASX [5-6]. ASX is a red xanthophyll carotenoid that mainly finds in seafood [7]. ASX exists naturally in a wide range of organisms including complex plants, fungi, crustaceans (such as shrimp and lobster) and microalgae [5].

Antioxidants have beneficial effects on health. Shrimp oil has Astaxanthin and omega 3 that act as powerful antioxidants and might have anti-inflammatory effects on cardiovascular diseases. This study aims to investigate the effects of shrimp oil supplementation on cardio-metabolic risk factors in overweight and obese children and adolescents.

Methods

Inclusion criteria were subjects aged 10 to 18 years overweight or obese subjects (body mass index (BMI) equal to or higher than the age- and sex-specific 85th percentile according to the World Health Organization) [22], those without any medication for treatment of dyslipidemia, hypertension, impaired blood glucose,those who did not take herbal products dietary supplements and non-steroidal anti-inflammatory drugs (NSAID).

Those with special diet for the past two months, allergy to seafood, unstable body weight (weight gain > 3 kg in the previous 12 weeks), thyroid disease, renal disease, cancer, hemophilia, insulin therapy, and any life-threatening diseases were excluded. Those participants with low compliance for following the study were excluded from the trial.

Methods

Assessment of anthropometric measurements

Blood pressure (BP) was determined using a mercury sphygmomanometer based on standard protocol. Weight and height was carefully measured .BMI was calculated.Waist circumference (WC) and hip circumference (HC) were determined with a non-flexible tape.

Biochemical analyses

Biochemical variables such as fasting blood sugar (FBS), total cholesterol(TC), triglyceride (TG), LDL-C and HDL-C were determined.

Dietary intake was obtained using food record questionnaire for three days at baseline and at the end of the study.

Methods

This randomized, triple-blind, placebo-controlled clinical trial was conducted on 64 overweight and obese participants with 10-18 years of age and finally 53 subjects (34 girls and 19 boys) completed the study. Subjects (n=53) were randomly allocated to either a shrimp oil group (n=30) or a placebo group (n=23).They were randomly assigned to receive either 500 mg shrimp oil or identical placebo once per day for eight weeks.

Each capsule of shrimp oil contains 210 mg phospholipids, 150 mg total omega-3, 75 mg docosahexaenoic acid, 45 mg eicosapentaenoic acid, 1 mg ASX and the remaining amount including other ingredients (BlueOcean NutraSciences Inc., Canada). Placebo contains medium-chain triglycerides (500 mg per capsule). Placebo was similar in appearance, color, and taste to shrimp oil.

Results

Overall, 53 participants completed the study; 30 subjects received shrimp oil and 23 subjects received placebo. There were no significant effects of shrimp oil on total cholesterol, triglyceride, HDL-C, LDL-C and blood pressure compared with the placebo group ($p>0.05$).Shrimp oil had no significant effects on body mass index, waist circumference and hip circumference compared with the placebo group ($p>0.05$). Supplementation with shrimp oil was not effective in reducing the anthropometric measures and other cardio-metabolic risk factors.

There were no significant differences in physical activity levels at baseline and after intervention between the two groups ($P>0.05$). the macro- and micronutrient intake did not have significant differences between the two groups. The correlation between dietary intake and blood lipid profiles in each group was assessed by Pearson’s correlation and there was not any statistically significant correlation between macro- and micronutrient intake and blood lipid profiles (data are not shown).

Conclusion

- ✓ Supplementation with shrimp oil had no significant effects on improving the anthropometric measures and shrimp oil could not significantly improve the levels of FBS, total cholesterol, LDL-C and TG as well as systolic and diastolic BP.
- ✓ Further large-scale and long-term clinical trials are needed to assess the shrimp oil benefits on cardio-metabolic risk factors in children and adolescents.
- ✓ Future clinical trials are needed to investigate the beneficial effects of higher doses of shrimp oil on cardio-metabolic risk factors in the pediatric age groups.

Discussion

To the best of our knowledge, this study is the first study that investigated the effect of shrimp oil supplementation on cardio-metabolic risk factors in children and adolescents with excess weight.

The findings of the current study did not show any significant differences in anthropometric parameters between groups. Furthermore, shrimp oil could not significantly improve the levels of FBS,TC, LDL-C and TG as well as systolic and diastolic BP.

HDL-C levels improved in shrimp oil in comparison with placebo group. However, this effect was not statistically significant (P=0.06).

Thank you for your attention