Background: Cardiovascular disease is one of the most common causes of death worldwide. Obesity, hyperlipidemia, hypertension and metabolic syndrome in children correlates to the prevalence of these diseases later in life. Omega-3-supplementation has been established as an effective strategy to decrease morbidity, mortality and risk factors for cardiovascular disease in adults. Despite this clear connection, the mechanism is less studied in children and adolescents.

Objective: To evaluate the scientific evidence for the effect of supplementation of omega-3 on blood lipids and endothelial function in children and adolescents with obesity and/or hyperlipidemia.

Search strategy: The literature search was performed in the databases PubMed, Scopus and Cochrane Library. Key words used in various combinations along with MeSH-terms were for example omega-3, n-3, child, adolescent, obesity, supplement, cardiovascular, endothelial and hyperlipidemia.

Selection criteria: Human studies with RCT, written in Swedish or English. The selection was limited to studies on children and adolescents with obesity and/or hyperlipidemia where the effect of omega-3-supplementation on blood lipids and endothelial function has been compared with placebo. Studies using food as supplementation were excluded.

Data collection and analysis: Four studies were included and their quality was assessed using the Template for quality review of randomized controlled trials produced by Swedish agency for health technology assessment and assessment of social services (SBU). The total evidence for each outcome measure was assessed with the Template foundation of the compiled evidence according to GRADE produced by University of Gothenburg.

Main results: Altogether the results showed a significant improvement in endothelial function. Concerning blood lipids, the results were not consistent. One study revealed a significant increase of total cholesterol, LDL and HDL; one showed significantly higher HDL. In one study a significant decrease in LDL was revealed for both placebo and intervention. One study revealed no significant differences in blood lipids. Difficulties with assessing the total evidence were observed due to lack of consistency and comparability.

Conclusions: There is weak (+++) scientific evidence that supplementation of omega-3 improves endothelial function and HDL and weak (+++) scientific evidence that supplementation of omega-3 does not improve LDL, triglycerides and total cholesterol in children at risk for cardiovascular disease. Due to the weak scientific evidence, there are no reasons in the current situation to recommend supplementation of omega-3 to improve endothelial function or blood lipids for a long-term decreased incidence in cardiovascular disease in children or adolescents with obesity or hyperlipidemia.

Keywords: Omega-3, intervention with omega-3-supplementation, obesity, hyperlipidemia, blood lipids, endothelial function.