

Obesity Endocrinology Congress 2019: Effects of probiotics and synbiotic on lipid profiles in adults at risk of type 2 diabetes: A double-blind randomized controlled clinical trial

Nazila Kassaian¹, Awat Feizi¹, Ashraf Aminorroaya¹, Maryam Tajabadi Ebrahimi², Atsa Norouzi¹, Masoud Amini¹

¹ Isfahan University of Medical Sciences, Iran

² Islamic Azad University, Iran

Background: The use of probiotics and/or prebiotics as the effective means of regulating gut microbiota may have a beneficial effect on metabolic disorders. Aims: This study was designed to assess the ability of probiotics and symbiotic to modify lipid profiles in subjects with prediabetes who are at risk of diabetes and cardiovascular diseases.

Introduction: Diabetes mellitus and prediabetes are becoming serious public health problems in the world. Moreover, cardiovascular disease (CVD) is the most leading cause of death and the major complication of type 2 diabetes mellitus (T2DM) and prediabetes. It has been demonstrated that impaired insulin metabolism predisposes individuals at risk of type 2 diabetes to CVD through dyslipidemia. So, the alteration in plasma lipid and lipoprotein profile has been strongly documented in diabetic and pre-diabetic patients. The central goal in CVD prevention and treatment is reducing the levels of serum cholesterol, low-density lipoprotein (LDL) cholesterol, and triglycerides as well as increasing in high-density lipoprotein (HDL) cholesterol. The pathogenesis of type 2 diabetes and cardiovascular diseases involves both genetic and environmental factors, among which gut microbiota as a new approach, play an important role. The association between gut microbiota and diseases has been set forth the demand for new functional products. It is suggested that consumption of probiotics and/or prebiotics as the functional foods would be a good approach for this meaning. Probiotics are live microorganisms that when administered in adequate amounts could confer a health benefit on the host. The most two commonly used groups of probiotic bacteria, are *Lactobacillus* and *Bifidobacterium*. Some studies indicated that probiotics may be able to decrease the levels of total cholesterol (TC), LDL-c and balance the ratio of LDL-c/HDL-c.

Prebiotics are non-digestible oligosaccharides that their use as the food ingredients on health has been recently triggered much research. Among other beneficial effects of prebiotics, the blood lipid reduction is of particular interest. Synbiotic that contains both probiotics and prebiotics is used to effectively modulate gut microbiota and the health benefit can be synergistic. The beneficial effects of synbiotic could be via mechanisms such as gut hormone balance, energy storage and dietary energy expenditure, production of short chain fatty acids (SCFA), and improvement in immune function and insulin resistance.

Therefore, it is hypothesized that supplementation with probiotic or prebiotic or synbiotic might be effective on the lipid and

lipoprotein profile improvement. Understanding the role of probiotics or synbiotics on lipid profiles may provide ideas for new prevention and treatment strategies in cardiovascular disease and the other complications of diabetes and prediabetes. However, there is the contradiction about this conception in previous studies. In view of the limited number of high-quality clinical trials in this regard and the contradictory results, the present study was designed to investigate and compare the effects of probiotics and synbiotic supplementation on lipid and lipoprotein profiles in pre-diabetic patients in a double blind randomized controlled parallel groups clinical trial.

Methods: In a randomized double-blind placebo-controlled clinical trial, 120 pre-diabetic adults aged 35-70 years from the first degree family of type 2 diabetic patients were recruited and randomly equally assigned to consume 6 g/d either probiotics, or symbiotic or placebo supplements for 6 months. Food record, physical activity, anthropometric measures and lipid profiles were assessed repeatedly at baseline, and 3 and 6 month supplementation.

Results: Up to know, we have not enough documents about the effects of synbiotics on lipid profiles in individuals with prediabetes who are at risk of diabetes mellitus and cardiovascular diseases. The current study demonstrated that consumption of synbiotic supplement in prediabetic individuals for 6 months resulted in a decrease in serum triglyceride levels compared to placebo. Previous animal studies have shown that the gut microbiome may play an important role in serum lipids, supporting the potential of therapies altering the gut microbiome to control triglycerides.

Probiotics and symbiotic were effective in reduction of serum triglycerides after 6 months of intervention (SMD=-10.6 and -9.4 respectively). Compared with the placebo, symbiotic resulted in a significant reduction in serum triglyceride levels (mean±SD: -9.4±6.6 mg/dl vs. +13.2±6.8 mg/dl, p=0.02). Serum total-, LDL-, and HDLcholesterol were unaffected by probiotic or symbiotic.

Conclusion: The results of this study demonstrated that supplementation with probiotic and especially symbiotic could decrease the concentration of triglyceride in pre-diabetic adults. This finding could warrant future studies to determine the therapeutic and preventive effects of these supplements in individuals at risk of diabetes and cardiovascular diseases.