

Rice bran oil and canola oil improve blood lipids compared to sunflower oil in women with type 2 diabetes: A randomized, single-blind, controlled trial



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KEYWORDS:

Type 2 diabetes;
Lipid profile;
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Rice bran oil

BACKGROUND: Hypolipidemic effects of vegetable oils have been demonstrated in a number of studies, but there is no study, which compares the effects of canola oil (CO) and rice bran oil (RBO) on diabetic patient. We aimed to compare the effects of CO and RBO consumption on blood lipids in women with type 2 diabetes.

METHODS: Seventy-five postmenopausal women with type 2 diabetes participated in this single-center, randomized, controlled, parallel-group trial in Shiraz, Iran. Participants were randomly allocated to three groups including a control group (balance diet + 30 g/d sunflower oil) and two intervention groups (balance diet + 30 g/day CO or RBO). At baseline and after 8 weeks, serum total cholesterol (TC), triglyceride (TG), low-density lipoprotein cholesterol (LDL-C), and high-density lipoprotein cholesterol (HDL-C) were measured.

RESULTS: At 8 weeks, mean of serum levels of TG (mg/dL), TC (mg/dL), and LDL-C (mg/dL) significantly decreased in the CO group (-23.66 , $P < .001$; -11.92 , $P < .001$; and -6.33 , $P = .013$, respectively) and RBO group (-38.62 , $P < .001$; -17.25 , $P < .001$; and -8.90 , $P = .002$, respectively) compared with the controls (7.01, 4.06, and 2.90, respectively). Also, in comparison with CO group, the changes of TG, LDL-C, and non-HDL-C levels were significantly more in the RBO group ($P = .007$, $P = .012$, and $P = .011$, respectively). Levels of serum HDL-C remained unchanged in all groups at the end of study.

CONCLUSIONS: Substitution of RBO or CO for sunflower oil could attenuate lipid disorders in type 2 diabetes women. Moreover, RBO could improve lipid profile more efficiently than CO.

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Introduction

Prevalence of type 2 diabetes mellitus (T2DM) is increasing in the world. These days, the number of individuals who are threatened by diabetes is over 360 million, and it is expected that its prevalence will reach to 552 million by 2030.¹ Diabetic patients are prone to

dyslipidemia and atherosclerosis, which both are the major risk factors for cardiovascular diseases (CVDs).

In recent years, mortality due to cardiovascular diseases has been increased in diabetic patients.² About two-thirds of people with diabetes have lost their lives as a result of CVD. High-serum triglycerides (TG) and low level of high-density lipoprotein cholesterol (HDL-C) are the most common lipid disorders in type 2 diabetic patients, which have important role in incidence of CVD. Therefore, effort to improve the lipid disorders to prevent CVD in diabetic patient is of importance.³⁻⁶ Numbers of studies have shown that manipulating the type of edible oil in a diet may slow down the progression of CVD.⁷

Rice bran oil (RBO) is one of the vegetable oils containing 25.5% saturated fatty acids (SFAs), 48% monounsaturated fatty acids (MUFAs), 26.5% polyunsaturated fatty acids (PUFAs), phytosterols, γ -oryzanol, and γ -tocotrienol with antihypercholesterolemic and antioxidant properties.⁸

Canola oil (CO) extracted from Rapeseed is a good source of MUFAs. According to Nurses Health Study's results, replacing 5% of energy from saturated fatty acids by MUFA led to lower TG, total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), Very low density

Table 1 Fatty acids composition of consumed oils

Fatty acids	Canola oil	Rice bran oil	Sunflower oil
C16	6.5	22.2	7.8
C18	2.5	2.9	4.9
C20	0.2	0.3	0.4
C22	0	0.1	0.9
C18:1	59.4	48.0	27.6
C18:2	21.3	24.6	58.0
C18:3	9.9	1.9	0
C20:1	0.2	0	0.4
Σ SFA	9.2	25.5	14.0
Σ MUFA	59.6	48.0	28.0
Σ PUFA	31.2	26.5	58.0

SFA, saturated fatty acid; MUFA, monounsaturated fatty acid; PUFA, polyunsaturated fatty acid.
All values are % of total fatty acids.

lipoprotein cholesterol (VLDL-C), and higher HDL-C levels.⁸⁻¹⁰ Also, CO and RBO contain about 10% and 2.2% α -linolenic acid (ALA), respectively, which may help to reduce serum triglycerides. It is shown that ALA

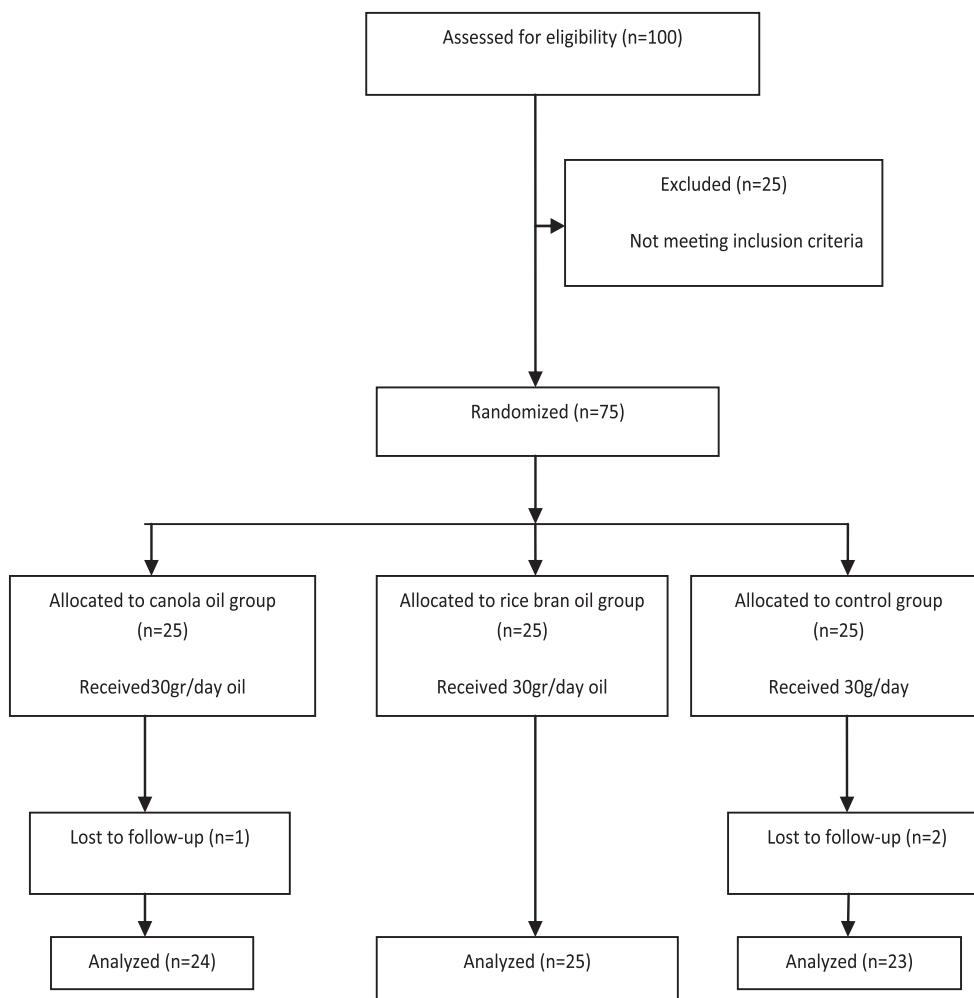


Figure 1 Participant's flow diagram throughout the study.

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