

Effect of Concentrated Pomegranate Juice Consumption on Glucose and Lipid Profile Concentrations in Type 2 Diabetic Patients

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Article information	Abstract
<p>Article history: Received: 26 Dec 2011 Accepted: 7 Mar 2012 Available online: 29 Oct 2012 ZJRMS 2013; 15(6): 40-42</p> <p>Keywords: Diabetes Blood glucose Lipid profiles Pomegranate</p> <p>*Corresponding author at: Department of Nutrition, Faculty of Medicine, Kashan University of Medical Sciences, Kashan, Iran E-mail: rashidi@kaums.ac.ir</p>	<p>Background: Diabetes mellitus is one of the most important metabolic disorders worldwide. As regards the anti-diabetic effects in different parts of pomegranate fruit, this study was performed to determine the effects of concentrated pomegranate juice (CPJ) consumption on blood glucose and lipid concentrations in type 2 diabetic patients.</p> <p>Materials and Methods: This quasi experimental study was performed on 55 diabetic patients, among patients referred to the Kashan Diabetes Center. Patients were divided into two groups: CPJ consumption and control. An anthropometric, medical and 24-hour food recall questionnaire was completed. Fasting blood sample before and after study was collected to measure glucose, HbA1c, TG, Chol, LDL and HDL. The patients consumed 45 g/day CPJ for 3 month. Control group did not received experiment. variables were measured at the end of the study again. Both groups received the same diet and physical activity advice during the study.</p> <p>Results: Cholesterol and LDL - cholesterol concentrations decreased in CPJ than control group but not significant ($p>0.05$). The mean glucose concentrations showed no significant change between CPJ group and control ($p>0.05$).</p> <p>Conclusion: concentrated pomegranate juice (CPJ) consumption there are no effective on blood glucose and lipid profiles concentrations in type 2 diabetic patients.</p> <p>Copyright © 2013 Zahedan University of Medical Sciences. All rights reserved.</p>

Introduction

Diabetes mellitus is one of the medical problems in all over the world. According to Iranian Diabetes Association, more than 8% of Iranian population has diabetes which includes about 3 million people. Deficiency or relative decrease of insulin in these patients associate with acute and chronic metabolic disorders [1]. Type 2 diabetes is approximately 90-95 percent of diabetes cases. Age, obesity, GDM and decreased physical activity are diabetes risk factors [2]. Pomegranate (*Punica granatum*) has been considered as a herbal plant since ancient times, so that different parts such as flowers, fruit peel, roots, bark and juice has been used in traditional medicine [3]. Pomegranate juice (PJ) contain some phenolic components such as ellagic acid, gallic acid, punicalagin, punicalin, chlorogenic acid anthocyanins. The content of phenolic compounds in PJ is about 0.2-1%, such as anthocyanins and tannins with antioxidant activity, so antioxidant activity of PJ is three times more than green tea [3-6]. Because of antioxidants, PJ have the anti-atherosclerosis properties [5,7]. PJ flavonoids increased activity of catalase, superoxide dismutase, glutathione peroxidase and glutathione reductase enzymes in addition to decrease blood cholesterol and LDL-cholesterol [8]. Study on type 2 diabetic patients with hyperlipidemia showed that concentrated pomegranate juice (CPJ) reduces total cholesterol and LDL-cholesterol significantly [9].

Experimental studies on animals indicate that serum cholesterol, triglyceride, and enzymes activity of ALT and AST significantly decrease after pomegranate consumption [10]. The effects of PJ on reduces in glucose and lipid profile such as triglyceride, total cholesterol and LDL-cholesterol in diabetic patients is inconsistent, as some studies show PJ consumption do not affect blood glucose and lipid profile [11]. Studies show that the pomegranate root extract, bark and flower decrease blood sugar in animals [12]. Present study examined the effects of concentrated pomegranate juice (CPJ) on blood glucose and lipid profile in patients with type 2 diabetes mellitus.

Materials and Methods

This quasi experimental study was performed on fifty five type 2 diabetic patients recruited from Kashan Diabetes Center, Iran. Patients with the fasting blood glucose 120-150 mg/dl and not receiving lipid lowering drugs, vitamin and mineral supplements. Informed written consent was obtained from each subject and patients divided in to two groups (CPJ consumption and control). Individual, medical and 24-h food recall questionnaires were completed for each patient. Anthropometric indices (height and weight) measured by using the Seca scale and meter to the nearest 0.1 cm and 0.1 kg respectively.

Fasting blood samples were collected to measure glucose, triglycerides, cholesterol, LDL and HDL. The CPJ group received 40 g/day of CPJ provided by Sahar Company for 3 month. Control group did not receive any intervention. For monitoring CPJ taking, patients received CPJ monthly and possible side effects were assessed each month. Patients phone were taken to remind the CPJ consumption. Considering variables were measured at the end of study again.

Statistical analyses were performed using the Statistical Package for Social Science (SPSS) version 13.0. Independent sample-t test was used to compare means between groups, analysis of covariance (ANCOVA) to adjust changes within the group with its initial rate and changes observed in the control group and χ^2 test was used to determine the relations. Significance level set as $p < 0.05$ for all test and Confidence Interval 95% was considered.

Results

Of fifty five diabetic patients who were enrolled 11 males (20%) and 44 females (80%). CPJ group has 33 (60%) and control group has 22 (40%) subjects. Subjects mean age was 50.6 ± 9.3 years. Mean age difference between two groups was not significant. Weight, BMI and waist circumference decreased in CPJ group than control group, but not statistically significant (Table 1). Energy and nutrient intake before and after the intervention have been shown in table 2. Energy, carbohydrate, protein, fat intakes and fiber in increased in CPJ group than control group, but not statistically significant.

Fasting blood sugar in the CPJ group decreased compared with the control group, but did not statistically significant. Glycated hemoglobin (HbA_{1c}) in the CPJ group increased after the intervention compared with the control group, but did not statistically significant. Covariance analysis showed a mean difference of glucose and HbA_{1c} after the intervention by eliminating the confounding effect of glucose and HbA_{1c} before intervention are not significant. Plasma HDL-cholesterol and triacylglycerol concentrations in the CPJ group increased after the intervention compared with the control group, but did not statistically significant.

Plasma total cholesterol and LDL-cholesterol concentrations in the CPJ group decreased after the intervention compared with the control group, but did not statistically significant. Covariance analysis showed a mean difference of total cholesterol, LDL and HDL cholesterol after the intervention by eliminating the confounding effect of total cholesterol, LDL and HDL cholesterol before intervention are not significant.

Discussion

This study showed, change in fasting blood glucose concentration in the CPJ group than the control group was not statistically significant (Table 2). Rosenblat et al. showed that daily 50 ml of pomegranate juice by diabetic patients for 3 month does not affect blood glucose

concentration [11]. So, according to the present results and Rosenblat findings pomegranate juice and CPJ consumption does not affect blood glucose concentration in diabetic patients. Pomegranate fruits contain about 10% sugar, which is probably can be one of the causes of reduces blood glucose [9, 13].

On the other hand, it can be concluded that the effect of pomegranate juice and CPJ are not dose -dependent because in Rosenblat study diabetic patients received 50 ml/day of pomegranate juice, but in present study that the subjects received 45 g/day CPJ, results of both studies are similar. The results of this study showed that CPJ consumption did not affect on HbA_{1c} (Table 2). Rosenblat et al. showed that HbA_{1c} relatively increased in pomegranate juice consumer but did not significant that the authors considered the sugar present in the pomegranate juice [11]. In the present study consumption of CPJ did not affect on serum triacylglycerol concentrations (Table 2). Esmailzadeh et al. showed that consumption of CPJ in diabetic patients with hyperlipidaemia have no effect on serum triacylglycerol concentrations [9].

These results approve with Rosenblat et al., because consumption of pomegranate juice in diabetic patients also have no effect on serum triacylglycerol concentrations [11]. According to the studies, can be concluded that consumption of pomegranate juice and CPJ have no effect on serum triacylglycerol concentrations.

The results also showed that the CPJ has no effect on cholesterol, LDL and HDL-Cholesterol concentrations in diabetic patients (Table 2). In Rosenblat et al. study Pomegranate juice consumption had no effect on cholesterol and LDL-cholesterol concentrations, but increased HDL-cholesterol concentrations significantly [11]. Cholesterol and LDL-cholesterol concentrations in Esmailzadeh et al. study decreased significantly, but had no effect on HDL- cholesterol [9]. Studies show that foods rich in flavonoids have hypocholesterolemic effects if subjects have hypocholesterolemia, as orange juice consumption in subjects with normal cholesterol and pomegranate juice in healthy subjects does not affect serum total cholesterol [14, 15].

Antioxidant capacity of pomegranate juice is 3-2 times more than red wine and green tea, on the other hand, the amount of antioxidants even small amounts of pomegranate juice are significantly more than the grapes and blueberries [6, 16]. Presence of antioxidant compounds in pomegranate juice are reduce of free radicals, oxidative stress and lipid peroxidation [11].

It seems that the above mentioned is true about pomegranate fruit, because Esmailzadeh et al. assessed the effect of CPJ on diabetic patients with hypercholesterolemia whereas Rosenblat et al. and present study subjects had a normal serum cholesterol. In conclusion, concentrated pomegranate juice (CPJ) consumption there are no effective on blood glucose and lipid profiles concentrations in type 2 diabetic patients.

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Authors' Contributions

All authors had equal role in design, work, statistical analysis and manuscript writing.

Conflict of Interest

The authors declare no conflict of interest.

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