Medical Science

The effect of Rhubarb stem extract on blood pressure and weight of type 2 diabetic patients

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Background and aim: Diabetes is a serious chronic disease that can damage the heart, blood vessels, eyes, kidneys and nerves, leading to death and early disability. Blood glucose control can prevent these complications. Also, a decrease in systolic blood pressure reduces the risk of each complication of diabetes and the risk of death from diabetes. Rhubarb is prescribed in traditional medicine for various patients, including patients with diabetes, high blood lipids and high blood pressure. However, its effect has not been scientifically reported. This study aimed to determine the efficacy of Rhubarb stem extract on hypertension and weight of type II diabetic patients. *Methods:* In this experimental study, 80 diabetic patients with type 2 diabetes mellitus in the city of Zabol, aged 30-60 years old, fasting blood glucose greater than 140 mg /dl and hypertension above 140/90 mmHg, after matching they were randomly divided into two groups of 40 patients treated with Rivas stem capsules and placebo. Patients in both groups were evaluated for blood pressure and weight before and after the study. *Results:* The mean systolic blood pressure and diastolic blood pressure in the rhubarb group before and after the intervention were 144.87 ± 8.73 and 95.75 ± 7.72, respectively, after intervention, to 133.95 ± 10.98 and $83.73 \pm 25.28\%$ decrease. Paired t-test and Wilcoxon showed a significant decrease in systolic and diastolic blood pressure and diastolic blood pressure with rhubarb intervention ($p < 0.05$), but no significant changes were observed in intervention and weight loss control groups ($p < 0.05$). *Conclusion:* The use of 400 mg Rhubarb stem capsules three times a day in type 2 diabetic patients can significantly decrease systolic blood pressure and diastolic blood pressure, but there is a significant difference in weight loss between the two groups before and then the intervention did not work.

INTRODUCTION

Diabetes is a serious chronic illness, (1) with more than 220 million people worldwide in 2010, the prevalence of diabetes in the world is 4.6%, which is between 3.8% and 2.10% of the closure Variable geographic area (2). Type 2 diabetes is associated with tissue resistance to insulin and a relative lack of insulin secretion, although insulin is produced by beta cells in these patients, but this amount is not sufficient to overcome insufficient resistance, resulting in increased blood glucose (3).

The World Health Organization estimates that Type-2 diabetes will rise from 171 million to 366 million in 2030. (4) Studies also show that in 2025 more than 75% of the total population of diabetics in the country (5) 4 to 5 million people with diabetes live in Iran (6). The World Health Organization (WHO) has reported it as an underlying epidemic (7), considering the increasing incidence of diabetes in the world.

Diabetes mellitus is characterized by symptoms such as hyperglycemia, urination, fatigue, weight loss, delayed healing of the wounds, blurred vision, increased glucose in the urine, and some other symptoms (8). The importance of this disease is due to the prevalence of its complications. Diabetes can damage the heart, blood vessels, eyes,

kidneys and nerves, leading to death and early disability (1). Diabetes complications include skin lesions, hypertension and weight gain (9), and vascular complications of diabetes, including nerve fibrosis, Nephropathy and retinopathy and macrovascular diseases, which are the leading cause of mortality in diabetic patients. Blood glucose, as well as high blood pressure and high blood lipids, contribute to the risk of cardiovascular disease 9. High blood pressure is one of the risk factors that, if not controlled, accelerate the progression of complications of diabetes, especially cardiovascular problems. The UKPDS study showed that any reduction in mmHg10 in systolic blood pressure causes a 12 percent reduction in the risk of each complication of diabetes and a 15 percent reduction in the risk of death from diabetes [10].

The number of people with diabetes is rapidly increasing due to population growth, population aging, urbanization and industrialization, and an increase in the prevalence of obesity and physical inactivity (11). Type 2 diabetes is associated with an increase in mortality and a decline in quality of life. Therefore, it puts a lot of economic burden on health systems and society (12).

To control diabetes, changes in lifestyle need to be made. Evidence suggests that if you have adequate blood glucose control, you can prevent or delay the long-term complications of diabetes (13). The primary treatment of type 2 diabetes is oral antidiabetic drugs (14). These drugs have disadvantages such as drug resistance development, side effects and even toxicity to response deficiencies. Moreover, none of these glucose lowering drugs effectively control blood lipid levels.

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discovery

Table 1 Comparison of FBS, HBA1C, systolic and diastolic blood pressure mean in Rhubarb group and placebo group before and after intervention

Group	Rhubarb group		p-value	Placebo group		p-value
	Before intervention	After intervention		Before intervention	After intervention	
FBS	288/80±94/49	226/42±88/89	0/0001	252/55±82/98	252/72±85/33	0/94
HBA1C	9/62±1/58	7/83±1/50	0/0001	9/52±1/67	9/49±1/68	0/72
Systolic blood pressure	144/78±8/73	133/50±10/98	0/0001	145/20±9/04	143/75±11/91	0/31
diastolic blood pressure	95/75±7/72	85/25±8/83	0/0001	95/37±8/72	93/37±7/95	0/19

Table 2 Comparison of the mean weight before and after taking Rhubarb and placebo

Variable	Before intervention	After intervention	T	Df	p-value
Mean of weight in Rhubarb group	74/97±10/98	75/83±12/89	1/43	21	0/15
Mean of weight in placebo	75/85±12/19	75/26±10/83	0/713	39	0/48

Therefore, with the increasing prevalence of diabetes and the adverse effects of synthetic drugs, there is a clear need for the development of natural herbal resources for anti-diabetic drugs (9).

Rheum ribes is a plant that is known as the Polygonaceae family (15), known as Rush, Rhubarb, or Rivend. Rhubarb root is used to treat diabetes, (15) and (16) hypertension, ulcers, obesity, diarrhea, and sputum (17). Rhubarb has a laxative effect and is used to treat constipation. Its root extract is also used to treat diabetes, stomach, liver, smallpox and rubella. Antioxidant properties and the presence of flavonoids in rhubarb, including quercetine, have been effective on blood glucose and metabolic disorders in diabetes. (18). One of the most important properties of rhubarb is that it causes the pancreas to secrete insulin and hence reduces blood glucose (19, 20). Rhubarb reduces lipid and blood pressure (21) and, in combination with cinnamon, has an anti-fatty and diabetes effect (22). Due to the increased prevalence of diabetes and cardiovascular and death problems, the result of this study was to determine the efficacy of rhubarb stem extract on blood pressure and weight in type 2 diabetic patients.

METHOD

This experimental study was performed on 80 patients with type 2 diabetes mellitus in Zabol city. Subjects were randomly divided into two groups of 40 patients receiving rhubarb and placebo extract. The criteria for entering the study include ages 35-60 years, type 2 diabetes for at least 6 months, fasting blood glucose greater than 140 mg/dl for at least two trials, systolic blood pressure above 140 mmHg and pressure Diastolic blood pressure greater than 90 mm Hg, speaking ability, ability to move and do activity, and not having late-onset diabetes complications such as cardiovascular disease, foot ulcer, eye problems According to physician, lack of Alzheimer's disease or mental illness and Psychiatric, non-pregnancy or lactation was the absence of any autoimmune disorder (6.23). Exit criteria included severe physical illness, drug discontinuation in diabetes control, oral glucose lowering drugs to insulin therapy, reluctance to use capsules, unwillingness to participate in research, use of cigarettes, alcohol and drugs. After explaining the purpose of the study for patients and obtaining written informed consent, a general information questionnaire including demographic information (24) and information about the disease were completed by interviewing each patient. Then, for both groups, blood pressure measurements Systolic and diastolic and weight. All patients were urged to continue their blood glucose-lowering drugs without any changes. The 90-gauge package of drug and placebo capsules was similar in appearance and was given by a special code and delivered to

the patient by the therapist without any knowledge of it, and a special code was inserted in the patient's file. Patients in the intervention group received a can of 90 capsules of 400 mg (daily 3 am, noon, night) of the stem extract of the rhubarb plant and the placebo group was similarly delivered to a can of 90 mg placebo capsules. Patients in both groups were evaluated for systolic and diastolic blood pressure and weight at the end of the study after a month.

FINDINGS

The findings of this study showed that the mean age of subjects in the intervention group was 50.22 6.72 and in the control group (placebo) 50.57 ± 6.60. The mean weight before the study in the intervention group was 74.97 ± 10.98 and 75.85 ± 12.19 in the control group. 27.5% of the participants in both control and intervention groups were male (n = 11) and 72.5% female (n = 29). Most of the research units were illiterate in both control and control groups (65%) and intervention (72.5%). There was no significant difference between the individuals in the intervention and control groups in terms of demographic factors (p <0.05). Based on independent t-test and Mann-Whitney test between the two intervention and control groups in terms of systolic and diastolic blood pressure and weight There was no significant difference (p <0.05).
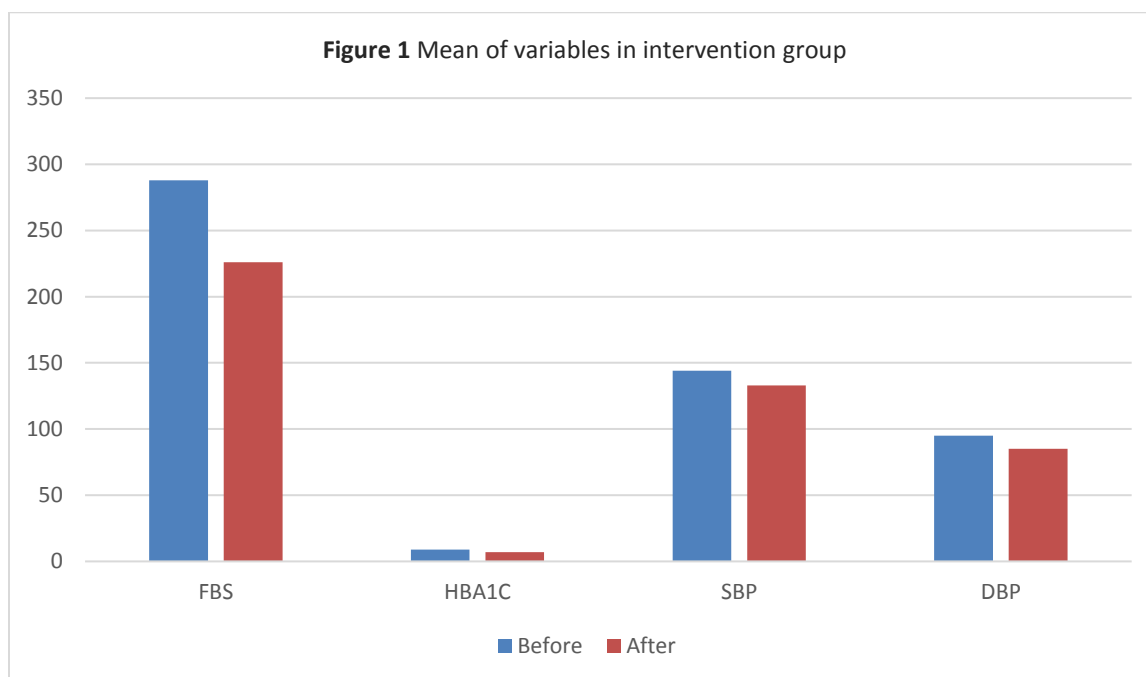
The mean of systolic blood pressure in the intervention group (rhubarb) before and after the intervention was 144.87 ± 8.73 and after intervention was 133.50 ± 10.98. Based on Wilcoxon's statistical test, this reduction in cytological blood pressure after rhubarb intervention 0> p was meaningful.

The mean of systolic blood pressure in the control group (placebo) was 45.15 ± 9.04 before placebo, which was 143.71 ± 11.91 after placebo. There was no significant difference between systolic blood pressure before and after placebo based on Wilcoxon test (p = 0.31).

The mean diastolic blood pressure in the intervention group (rhubarb) before and after the intervention was 95.75 ± 7.72 and 88.25 ± 8.73 after intervention, which according to Wilcoxon statistical test, this decrease in diastolic blood pressure after rhubarb intervention 0> p was meaningful.

The mean diastolic blood pressure in the control group (placebo) before the placebo was 95.37 ± 8.72, which was 93.37 ± 7.95 after placebo. Based on the Wilcoxon test, there was no significant difference between diastolic blood pressure before and after placebo (p = 0.19).

The mean of weight before intervention in the rhubarb and placebo group was 74.97 ± 10.98 and 75.85 ± 12.19, which was 73.35 ± 12.82 and 83.75 after intervention in the intervention group, respectively. / 10 ± 26/75. There was no significant difference between the mean of

Figure 1 Mean of variables in intervention group

weight before and after intervention in both groups of rhubarb and placebo (p> 0.05); (Table 2), (Figure 1).

DISCUSSION

The results of this study indicate that the mean systolic and diastolic blood pressure in the control group (placebo) before the placebo was 45.15 ± 9.04 and 95.37 ± 8.72, respectively, which was 91 / 143.75 ± 11 and 93.37 ± 9.99, respectively. Based on the Wilcoxon test, there was no significant difference in systolic and diastolic blood pressure after placebo (p = 0.31). The mean of systolic blood pressure in the rhubarb group before and after the intervention was 144.87 ± 8.73 and after the intervention was 133.50 ± 10.98. Based on Wilcoxon statistical test, this decrease in cytological blood pressure after rhubarb intervention was> p was meaningful. The mean diastolic blood pressure in the rhubarb group before and after the intervention was 95.75 ± 7.72 and 88.25 ± 8.73 after intervention, which according to the Wilcoxon statistical test, this decrease in diastolic blood pressure after rhubarb intervention with p <0.05 Was meaningful. The mean of weight before intervention in the rhubarb and placebo group was 74.97 ± 10.98 and 75.85 ± 12.19, which was 73.35 ± 12.82 and 83.75 after intervention in the intervention group, respectively. / 10 ± 26/75. There was no significant difference between the mean of weight before and after intervention in both groups of rhubarb and placebo (p> 0.05).

Considering the above findings, consumption of oral capsules of rhubarb stem can significantly decrease blood pressure in type 2 diabetic patients. The study of Baharond Ahmadi (2016), used as herbal remedy for cardiovascular disorders, also shows the effects of rheumatoid arthritis (26), which is consistent with our study. Baharvand also states that antioxidant activity is one of the most important biological effects of medicinal plants, and this effect is mainly related to the presence of secondary metabolites, especially phenolic compounds, and medicinal plants such as rhubarb with antioxidant effects in the treatment of high blood pressure can Be effective. The study of Hamza and Fallah also emphasize the antioxidant effects of this plant (18,27). Also, in the study of Fallah Hosseini, this herbal medicine had no effect on the level of

liver enzymes SGOT, SGPT and creatinine, indicating the health and safety of rhubarb (27). The study by Baha'addini, titled "The Effect of Rhubarb Flower on the Blood and Alcoholic Extract of Rhubarb Flower on Blood Pressure in Male Rats," also showed a decrease in mean arterial pressure, systolic and diastolic pressure, and a significant decrease in heart rate in the intervention group compared with the control. We are glad to use the Rhubarb flower in the study of Bharwand, but in the present study, Rhubarb stem has been used. In his study, Baharvand states that after acetylcholine injection in both control and rhythm tests, heart rate decreased, but in the experimental group it decreased more than the control group, as a result of the effect of decreased blood pressure on the possible rat. It can be rhubarb through the chronotropic effect of the heart (28). Hypertension is also rapidly associated with the accumulation of plaque atherosclerosis in the arterial wall (26). Therefore, the effects of rhubarb hypertension can be attributed to the antioxidant, triglyceride and cholesterol (18, 27) effects.

CONCLUSION

Since blood glucose control can prevent serious complications of diabetes, as well as a decrease in blood pressure, it reduces the risk of any complication of diabetes and the risk of death from diabetes. Therefore, the current study, considering the effects of Rhubarb stem on the reduction of weight and blood pressure in diabetic patients, it is suggested that plant herbal remedies, especially rhubarb, should be considered in the treatment schedule of these patients, and extensive research into the effects of this herb in diabetic type 2 patients should be considered.

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