



Treatment of hypertension with *Hibiscus sabdariffa* in Diabetes type-II patients

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Abstract The efficacy and potency of *Hibiscus sabdariffa* (HS) in the treatment of risk factors associated with various cardiac and hypertensive disease is presented in this paper. Anthocyanins found in abundance in *Hibiscus sabdariffa* sepals are generally considered the phytochemicals responsible for the antihypertensive and hypocholesterolemic effects. Decoctions and infusions of sepals and tender leaves are used in whole world in the treatment of hypertension, hyperlipidemia and various cardiovascular ailments with no reported adverse events or side effects, except for possible adverse hepatic and renal effects at increased doses ie more than 5000mg/kg/day. The daily consumption of extract produced from Hibiscus sepals significantly decreases systolic blood pressure (SBP) and diastolic blood pressure (DBP) in adults with pre to moderate essential hypertension and type 2 diabetes. The studies revealed that effectiveness of extract is equivalent to Captopril, but less effective than Lisinopril. This comprehensive body of evidence suggests that extracts of *Hibiscus sabdariffa* sepals are promising in the treatment of hypertension and hyperlipidemia in diabetes -II patients. For the study, 60 volunteers suffering from diabetes with mild hypertension were recruited. But volunteers were devoid of any kind of medication for hypertension, hyperlipidemia or high cholesterol levels. The patients were randomly grouped into two groups HT and BT and asked to drink infusions of Black tea (BT) and HT (Hibiscus tea) twice a day for a month. Their BP was measured uniformly at regular intervals. The mean of Systolic BP decreased from 134.4±11.8 mmHg to 112.7±5.7mm Hg with HT after one month; whereas in case of BT group measure changed from 118.6±14.9 to 127.3±8.7 mm Hg.

Keywords *Hibiscus sabdariffa*, Hypertension, Diabetes, Black tea, Blood pressure.

Introduction

Hibiscus sabdariffa belonging to family Malvaceae is in widespread use across the whole world as a beverage and as a treatment for hypertension, hyperlipidemia and various minor cardiovascular problems [1]. Problems of High blood pressure (BP) usually found along with diabetes mellitus, occurring twice as frequently in diabetic as in non-diabetic persons. The risks of cardiovascular disease in people with diabetes gets raised up to 75%, contributing significantly to the overall morbidity and mortality in this high-risk population [2]. It is estimated that in 2025, there will be 333 million patients in developed countries and 639 million patients in developing countries suffering from hypertension [3-4]. The phytochemical, pharmacological and toxicological properties of *H. sabdariffa* have been investigated in many studies. The calyces or sepals of *H. sabdariffa* are used in many parts of the world to make cold and hot drinks. *H. sabdariffa* contains many chemical constituents including alkaloids, L-ascorbic acid, anisaldehyde, anthocyanin, β -carotene, β -sitosterol, citric acid, cyanidin-3 rutinoside, delphinidin, galactose, gossypetin, hibiscetin, mucopolysaccharide, pectin, protocatechuic acid, polysaccharide, quercetin, stearic acid and wax. In folk medicine, the calyx extracts are used for the treatment of several complaints, including high BP, liver



diseases and fever. In view of its reported nutritional and pharmacological properties and relative safety, *H. sabdariffa* and compounds isolated from it could be a source of therapeutically useful products [5-6]. Although the mechanism of action of lowering BP is not proven as yet, but different studies have reported a direct effect on the sympathetic nervous system, vascular muscles, calcium channels, cholinergic and histaminic mechanisms and rennin-angiotensin system. The antioxidative and diuretic effects are the most important mechanisms suggested for their hypotensive effects [7-8].

Materials and methods

Study method: This study is based on the results of sequential randomized controlled clinical trial which was conducted on 60 diabetic patients. Patients must have type II diabetes mellitus for more than 5 years, showing mild hypertension according to JNC-VI criteria [9]. Systolic BP (SBP) <160 mmHg and diastolic BP (DBP) <100 mmHg, and patients must be devoid of antihyperlipidaemic or antihypertensive drugs. In addition to these criteria, the patients were allowed to receive oral hypoglycemic agents and insulin drugs as their routine treatment. After obtaining informed consent from all patients, they were randomly assigned to one of these two groups: HT (Hibiscus tea) group or BT (Black tea) group. Patients in the HT group were given HT sachets and those in the BT group were given BT sachets that were similar in shape and weight. Instructions for preparation and usage of black and ST were given. The patients were instructed to use one glass of the tea decoction two times a day for 1 month.

Method of preparation of infusion: According to various studies, drinking tea was advised to be continued for 1 month, twice a day, once in the morning and afternoon, between the main meals. The patients were asked to pour the contents of one tea sachet, weighing 2.5 g in 250 ml of boiling water and drink it after 30 min with one cube of sugar (5 g). They were prohibited from drinking any other type or amount of tea during the study, and their medications and diet were kept unchanged

Measurements of blood pressure: On days 1, 15 and 30 of the study, the patient's BP was measured by a general physician on their right hand in seated position. BP was measured twice at 5–10 min intervals and the average was recorded. Stethoscope and mercury sphygmomanometer (Panasonic, Japan) with a 14 × 50 cm cuff were used for measuring BP. The hypotensive effect was calculated as the difference between basal BP at the beginning and at the end of each follow-up stage of the study [10].

Statistical analysis: The overall variation (0–30 days) of BPs was compared between the two groups.

Variable	Group	Basal	Day 15	Day 30
SBP (mm Hg)	Hibiscus tea	133.4±11.8	123.3±10.9	113.7±5.79
	Black tea	116.6±14.9	119.7±13.6	126.3±8.74
DBP (mm Hg)	Hibiscus tea	82.6±6.1	84.0±7.8	80.5±8.9
	Black tea	76.7±7.6	79.0±8.2	80.0±9.3

Result

Despite the majority of females among the patients, the sex distributions in these two groups did not show a statistically significant difference. Eighty percent of patients were on oral antihyperglycaemic agents, 10% on insulin therapy and 10% on diet only as their treatment. Regarding the treatment method, there was no statistically significant difference between the two groups. Twenty-one percent of the participants had normal weight, 51% were overweight and 28% were obese. Regarding obesity and overweight, there was no statistically significant difference between the two groups. The Means of weight, duration of diabetes and BMI were not statistically different between the two groups, but the means of DBP, SBP and PP were significantly different.

Discussion



The main objective of this study was to evaluate the short-term therapeutic effects of drinking HT on the BP of patients with type II diabetes and to compare the results with those of BT. But findings of various studies showed that the mean of SBP in HT consumers (HT group) decreased from 134.4 to 112.7 mm Hg, which is statistically significant. In the BT consumers (BT group), BP increased from 118.6 to 127.6 mm Hg. SBP decreased in the HT group but increased in the BT group, and both of them were statistically significant.

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