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The effectiveness of *Hibiscus sabdariffa* in the treatment of hypertension: A systematic review

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ABSTRACT

Introduction: Hypertension is a common global health problem with significant mortality and morbidity. *Hibiscus sabdariffa* is a plant known in many countries and is consumed as hot and cold drinks In addition to its use in folk medicine; it has been suggested as treatment for many conditions including hypertension.
Objectives: The objectives of this review were to examine the evidence of effectiveness and safety of hibiscus in the treatment of hypertension.
Methods: We searched several medical databases (MEDLINE, EMBASE, CINAHL, Cochrane Central Register of Controlled Trials, and the specialized register of the Cochrane Hypertension Group and the general engine Google) to January 2009.

We included randomized controlled trials that had examined Hibiscus's effectiveness and safety in the treatment of primary hypertension in adults. Two authors independently selected the trials for the review, extracted the data, and critically appraised the included studies.
Results: Four trials, with a total of 390 patients, met our inclusion criteria. Two studies compared *Hibiscus sabdariffa* to black tea; one study compared it to captopril and one to lisinopril. The studies found that Hibiscus had greater blood pressure reduction than tea but less than the ACE-inhibitors. However, all studies, except one, were short term and of poor quality with a Jadad scoring of < 3 and did not meet international standards.
Conclusion: The four randomized controlled studies identified in this review do not provide reliable evidence to support recommending *Hibiscus sabdariffa* for the treatment of primary hypertension in adults.

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Introduction

High blood pressure is a global health problem with significant magnitude of morbidity and mortality, it has been estimated that 1 billion individuals all over the world suffer from hypertension causing up to 7.1 million deaths per year, which is about 13% of total death worldwide, and it is one of the ten factors contributing to the global burden of disease (Brown 1997).

Among the pharmacological agents used to treat hypertension are angiotensine converting enzyme (ACE) inhibitors, and diuretics (Neal et al. 2000; Gallagher et al. 2006). However, there are still needs for additional agents for resistant hypertension, and also for non-pharmacological measures that might be encouraged at population level.

Hibiscus sabdariffa is one potential non-pharmacological treatment. In folk medicine, the calyces' infusion is used for the treatment of several conditions including high BP.

Anthocyanins and proanthocyanidins compounds, detected in abundance in the aqueous infusion of the Hibiscus calyces, could be the bioactive compounds responsible for lowering the blood pressure based on earlier studies which proved the antihypertensive effects of anthocyanins through the inhibition of angiotensine II converting enzyme and hence a vasodilatation effect (Jonadet et al. 1990) in addition to its diuretic effect and the increased concentration of urinary sodium while maintaining normal potassium levels (Onyenekwe et al. 1999).

Objectives

The objectives of this review are to determine the effectiveness and safety of *Hibiscus sabdariffa* in the treatment of patients with pre-hypertension or hypertension ($\geq 140/90$), with the specific

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outcome of reduction in systolic blood pressure (SBP), diastolic blood pressure (DBP) or both.

Methods

We included randomized controlled studies which compare Hibiscus to placebo, to other herbal or pharmacological preparation or to no other intervention in the treatment of adults (18-70 years), with the diagnosis of pre-hypertension 130-139/85-89 or primary hypertension of stage I or II according to the JCT classification (Chobanian et al. 2003), irrespective of patients' gender or co-morbidity.

Search Strategy

We searched the several databases (MEDLINE, EMBASE, CINAHL, Cochrane Central Register of Controlled Trials, Cochrane library for systematic reviews, the specialized register of the Cochrane Hypertension Group, ClinicalTrials.gov and the general search engine Google) from commencement until January 2009. Using the search words (Hibiscus, *Hibiscus sabdariffa*, Sour tea, Roselle, Red sorrel, Karkade, Jamaica, Flor de Jamaica, herbal tea, herbal medicine) and in combination with (high blood pressure, elevated blood pressure, hypertension, pre-hypertension, mild hypertension), there was no limitation to language. We reviewed the reference list for any potential study and we contacted authors when further information was enquired, we did not conduct hand search.

Identification of included studies

All titles and abstracts retrieved by electronic searching were screened independently by two reviewers and the studies which clearly did not meet the inclusion criteria were excluded. Copies of the full text of potentially relevant references were obtained and their eligibility was assessed independently by two reviewers. Differences between reviewers were resolved by discussion.

Data extraction and studies evaluation

The data were extracted and categorized by two authors including number of patients, type of comparison to hibiscus (placebo or other herbal or pharmacological agent), duration of treatment and the primary outcome which was the reduction in the SBP, DBP or both, expressed as Means ± SD. The trials were assessed for methodological quality using Jadad Score (Jadad et al. 1996) in addition evidence of allocation concealment and adequacy of addressing incomplete data were assessed.

Results

The literature search retrieved 523 titles of which we reviewed ten potential abstracts and the full text was retrieved for six studies (Haji Faraji and Haji Tarkhani 1999; Herrera-Arellano et al. 2004, 2007; Mozaffari-Khosravi et al. 2008; Diane et al. 2008; Wright et al. 2007), four of which met the inclusion criteria. The description of the selected studies is included in (Table 1) and the results of the studies are included in (Table 2).

One study was excluded because only the abstract was published and the authors did not provide us with information about the methodology of the study (Diane et al. 2008) and the other study was a review of studies mostly done on animals (Wright et al. 2007).

The results of the 2 studies of hibiscus against black tea suggest a modest reduction of systolic and diastolic blood pressure; the two studies that compared hibiscus to ACE-inhibitors showed similar declines in blood pressure, but less than that of ACE-inhibitors. However, Meta-analysis was not done due to the poor methodology of the studies and the low Jadad score (Table 2). Table 3 shows the methods for hibiscus preparation and use.

Discussion

Our systematic review of the effectiveness and safety of *Hibiscus sabdariffa* in the treatment of hypertension found insufficient high quality research. Three of the four studies we included in this review were of poor methodological quality. One of the included studies did not mention how the randomization was done (Haji Faraji and Haji

Table 1
Results of the identified studies.

First Author (Year of publication)	Participants		Stage of HT according to the JCPTTH-7th Report	Experimental treatment	Control treatment	Duration	ResultsDSBP (Means ± SD)DDBP (Means ± SD)		A/E
	E	C					E	C	
Haji Faraji. M et al. (1999)	31	23	Stage II	ST	BT	2 WEEKS	DSBP (17.6 ± 11.3)DDBP (10.9 ± 7.6)	(6.3 ± 6.6)(3.5 ± 5.2)	NR
Herrera-Arellano. A et al. (2004)	53	37	Pre-HT & stage I	HS extract	Captopril	4 WEEKS	DSBP (14.2 ± 11.8)DDBP (11.2 ± 6.9)	(16.4 ± 9.6)(13.1 ± 7.2)	NR
Herrera-Arellano. A et al. (2007)	100	93	Stage I & Stage II	HS standardized extract	Lisinopril	4 WEEKS	DSBP (17.1 ± 10.0)DDBP (12.0 ± 7.0)	(23.3 ± 70)(15.4 ± 60)	NR
Mozaffari-Khosravi. H et al. (2008)	27	26	Pre-HT & stage I	ST	BT	4 WEEKS	DSBP (15.0 ± 7.5)DDBP (4.3 ± 12.3)	(8.4 ± 11.0)(4.6 ± 11.8)	NR

Key: E=Experimental; C=Control; HT=Hypertension; Pre-HT=Prehypertention; ST=Sour tea; HS=*Hibiscus sabdariffa*; BT=Black tea; A/E=Adverse event; NR=Not recorded; JCPTTH=Joint national committee of prevention detection and treatment of hypertension 7th report; DSBP/DDBP=difference in systolic/diastolic blood pressure.

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