

Review

Cinnamon in glycaemic control: Systematic review and meta analysis

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SUMMARY

Background & aims: Cinnamon seems to be highly bioactive, appearing to mimic the effect of insulin through increased glucose uptake in adipocytes and skeletal muscles. This systematic review and Meta analysis examined the effect of cinnamon on glycaemic control in patients with Type 2 Diabetes mellitus. **Methods:** A systematic literature search was conducted from the earliest possible date through to 01 August 2011. Search terms included free text terms, MeSH and Medline medical index terms such as: “cinnamon”, “cinnamomum”, “cinnamomum cassia”, “cinnamomum zeylanicum”, “type 2 diabetes mellitus”. Each was crossed with the term “diabetes mellitus”. In addition, references of key articles were hand searched.

Results: A total of 6 clinical trials met the strict inclusion criteria and considered a total of 435 patients; follow up between 40 days–4 months, doses ranging from 1 g to 6 g per day. Meta-analysis of RCTs showed a significant decrease in mean HbA1c [0.09%; 95% CI was 0.04–0.14] and mean FPG [0.84 mmol/l; 95% CI was 0.66–1.02].

Conclusions: Use of cinnamon showed a beneficial effect on glycaemic control (both HbA1c and FPG) and the short term (<4 months) effects of the use of cinnamon on glycaemic control looks promising.

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1. Introduction

Research has suggested that cinnamon may have potentially useful pharmacological effects for the treatment of diabetes.^{1,2} Although there are different species of cinnamon, *Cinnamomum zeylanicum* is categorised as true cinnamon when referred to as a spice, but the glucose lowering effect of *Cinnamomum cassia* spices is thought to be superior.³ Early studies suggested that cinnamon can be used effectively to lower blood glucose^{1,2} and cholesterol¹ levels in type 2 diabetes mellitus [T2DM]. However, recent studies reported that cinnamon did not seem to improve glycaemic control in type 2^{4,5} or type 1 diabetic patients.⁶ In contrast, studies in people with pre diabetes/insulin resistance and metabolic syndrome revealed that cinnamon has the potential to improve glycaemic control and insulin sensitivity.^{7,8}

The blood glucose lowering potential and pharmacological properties of cinnamon has been demonstrated previously *in vitro* and *in vivo* animal studies.^{9–14} Cinnamon polyphenols display insulin like properties and stimulate glucose uptake in skeletal muscle and adipose tissue.^{9,11,15} More recently nutritional research on diabetes has increased and producing higher quality RCTs. It is

therefore possible to appraise new evidence on the effectiveness of dietary intervention of cinnamon supplementation on the management of glycaemic control in T2DM. Providing a new emphasis on managing T2DM by using an effective dietary intervention might prove to be an attractive option given the dramatic increase in the incidence of T2DM. The aim of this review is to investigate whether cinnamon has a potential effect on glycaemic control in patients with T2DM.

2. Materials and methods

A systematic electronic literature search was carried out to identify and analyze all relevant literature providing information regarding the glucose lowering effect of cinnamon. All human intervention studies of RCTs of cinnamon and T2DM conducted from earliest possible date and August 2011 were included. Using these criteria, a search of the following databases was conducted:

- All EBM reviews –Cochrane Database of Systematic Reviews, ACP Journal Club, DARE, CCTR, CMR, HTA and NHSEED, Allied and Complementary Medicine
- EMBASE and Ovid MEDLINE(R)
- JAMA, BMJ, High wire Press and Lancet databases January 2000 to March 2011.

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Medical subject headings (MeSH) used for searching were 'type 2 diabetes', 'diabetes', 'cinnamon' 'glycaemic control' and 'blood glucose'. The literature search was confined to English language articles only. Fig. 1 provides the inclusion and exclusion criteria used in this review. A total of 322 articles were identified, of these 6 studies met the strict inclusion criteria for RCTs of cinnamon and

T2DM. The methods and results sections of all 322 selected papers were reviewed independently by two authors. Out of these 322 articles, 303 were excluded either due to duplicates, *in vivo* animal studies, *in vitro* studies, not published in English language, did not have an abstract or author's name, or did not include a proper intervention method. From the remaining studies ($n = 19$) of *in vivo*

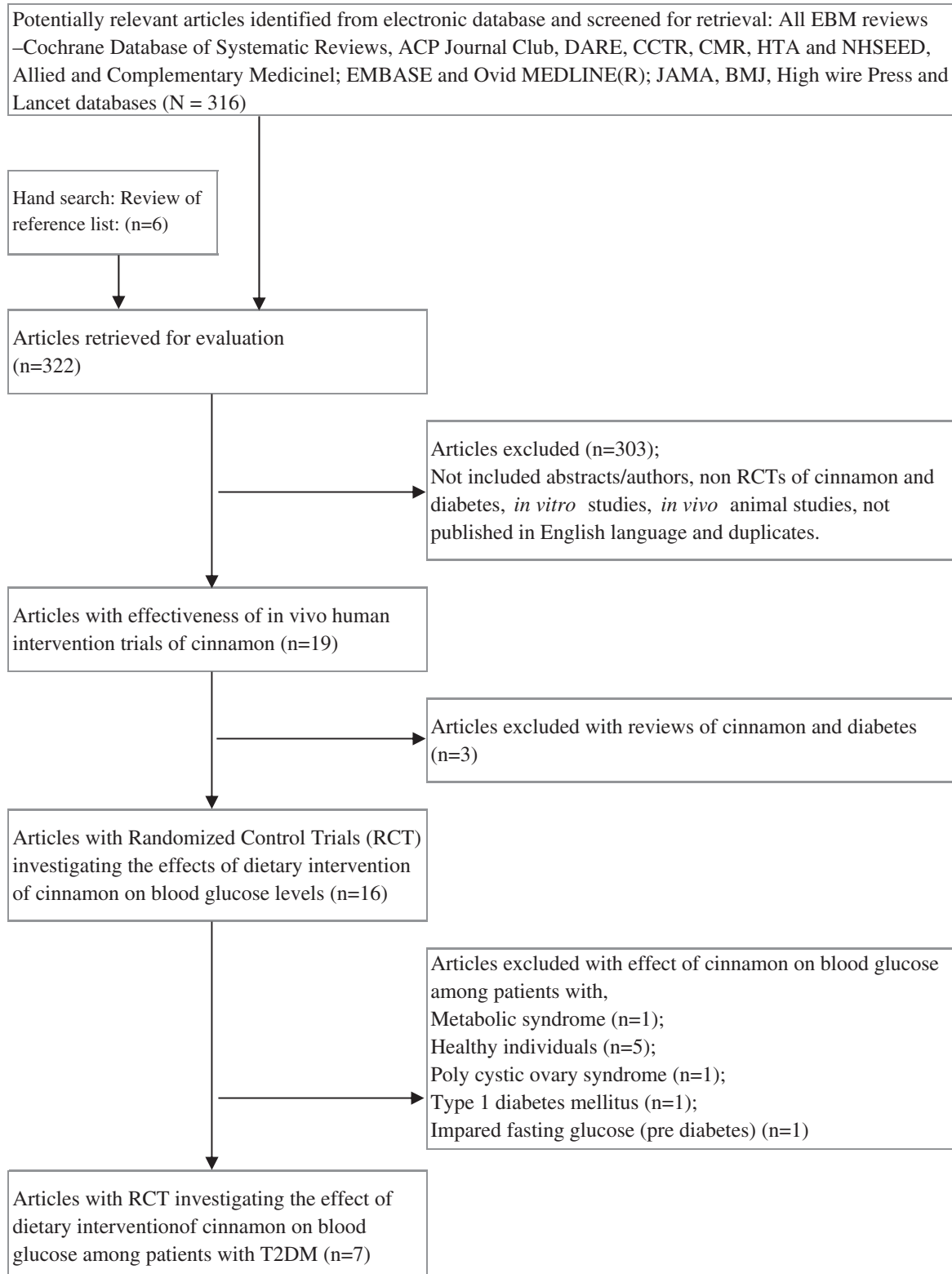


Fig. 1. Systematic review flow diagram; n = number of articles, RCT – randomized control trials.

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