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Effect of cinnamon on glycaemic control? A meta-analysis of randomised control trials

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Background: Cinnamon could be used as a dietary supplement to improve glycaemic control in people with diabetes. In the absence of strong supporting evidence from previous individual randomised controlled trials (RCT), a meta-analysis from all published RCT were carried out to identify the blood glucose lowering potential of cinnamon among patients with type 2 diabetes mellitus (T2DM).

Methods: The RCT using cinnamon for the treatment of T2DM were searched systematically from earliest possible date to November 2010. Searches included all EBM reviews, Cochrane library, MEDLINE, EMBASE, JAMA, BMJ and High wire press. RCT reporting the effect of cinnamon on glycated haemoglobin (HbA1c) and fasting plasma glucose (FPG) only were included in this study. Rev Man5.0 was used for meta-analysis (Cochrane collaboration). The mean change (baseline v. post intervention) was treated as a continuous variable, outcomes were analysed by weighted mean difference, as difference between the means in the control (placebo) and treatment (cinnamon) groups (fixed-effect model). Chi-square test ($\alpha = 0.05$) was used for heterogeneity test, and weighted mean difference was also calculated (95% CI).

Results: As a result, six RCT of cinnamon and T2DM were included for further review and analysis^(1–6). Meta-analysis of this six RCT^(1–6) demonstrated 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).

Table 1. Randomised controlled trials reporting the blood glucose lowering effect of cinnamon in T2DM

Study	Study design	Sample size	Withdrawals	Study duration	Dose of cinnamon	Study site	Outcome measures
Khan <i>et al.</i> (2003)	RCT non-blind	C = 30 P = 30	N 0	40 d	1, 3 or 6 g cinnamon	Pakistan	FPG
Mang <i>et al.</i> (2006)	RCT double blind	C = 33 P = 32	N 12	4 months	3 g cinnamon extract	German	FPG and HbA1c
Vanschoonbeek <i>et al.</i> (2006)	RCT double blind	C = 12 P = 13	N 0	6 weeks	1.5 g cinnamon	Netherlands	FPG and HbA1c
Blevins <i>et al.</i> (2007)	RCT double blind	C = 28 P = 30	N 17	3 months	1 g cinnamon	USA	FPG and HbA1c
Crawford (2009)	RCT non blind	C = 55 P = 54	N 20	90 d	1 g cinnamon	USA	HbA1c
Akilen <i>et al.</i> (2010)	RCT double blind	C = 30 P = 28	N 3	12 weeks	2 g cinnamon	UK	FPG and HbA1c

Discussion: Meta-analysis based on a few small trials should be treated with caution. There are some limitations of the analysis that needs to be addressed. This meta-analysis only included six RCT (may be underpowered), the sample size is small and unpublished RCT were not included, and these factors may cause bias. We have done our utmost to include all published studies to avoid selection bias. Furthermore, this analysis only included short-term interventions (<4 months) of 1 g, 1.5 g, 2 g, 3 g or 6 g of cinnamon and placebo controlled trials, and this requires further long-term trials with different cinnamon dose levels.

Conclusion: Our meta-analysis demonstrated that short-term (<4 months) effects of the use of cinnamon on glycaemic control (both HbA1c and FPG) looks promising.

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