Original Article

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Efficacy of cinnamon in treating individuals with diabetes: An updated systematic review and meta-analysis

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Abstract

Cinnamon supplement is used frequently as a complementary therapy in individuals with diabetes. This systematic review aims to evaluate the efficacy of cinnamon supplement in treating individuals with diabetes.

We conducted a systematic literature search and identified the studies evaluating the efficacy of cinnamon supplementation in patients with diabetes. Weighted mean differences were determined within a random effect model. Primary outcome was glycemic control. Secondary outcomes assessed were lipid levels and adverse events related to cinnamon supplement.

Twelve RCTs (pooled sample size: 1050 with 514 in the intervention arm) with data on the efficacy of cinnamon on treating individuals with diabetes were included in this systematic review. Of these, eleven studies were included in the quantitative synthesis. Analysis showed that cinnamon supplementation for 8-16 weeks was associated with significant reduction in fasting blood sugar (SMD = -12.06, 95% CI: -16.35 to -7.77, $p<0.05$) and post-prandial blood sugar (SMD =-11.28, 95% CI: -16.82 to -5.75, $p<0.05$). When cinnamon supplement was given for ≥ 12 weeks it was associated with reduction in HbA1c (SMD = -0.26, 95% CI: -0.41 to -0.10, $p<0.05$). Five RCTs (pooled sample size: 576 with 278 in the intervention arm) provided data on the effect of cinnamon on lipid profile. When data from these studies were pooled there was significant change in total cholesterol and LDL in cinnamon supplementation group compared to control group.

Cinnamon supplementation for 8-16 weeks was associated with an improvement in glycaemic control and lipid profile.

Keywords: cinnamon, diabetes, glycemic control

Background:

Diabetes is one of the major global health concerns [1]. Although several antidiabetic medicines are being used, these involve high cost and these medications are not without side effects. Therefore, medicinal plants with beneficial effects may be considered as complementary therapies.

Cinnamon, a common spice, is traditionally used for centuries in many countries as a remedy for many diseases including diabetes [2,3]. There are two main varieties of cinnamon; Cinnamomum zeylanicum (CZ) which is also known as Ceylon cinnamon or true cinnamon; and Cinnamomum cassia (CC) which is also known as Chinese cinnamon [3]. Several bioactive compounds are found in cinnamon [2]. Of these cinnamic acid and cinnamaldehyde are the major compounds [4,5]. In vitro and in vivo studies have shown several benefits of cinnamon. These include hypoglycemic, lipid lowering, anti-inflammatory and anti-oxidant effects [2,5,6]but it has also been used in natural Eastern medicine. Cinnamon extracts are vital oils that contain biologically active compounds, such as cinnamon aldehyde, cinnamic alcohol, cinnamic acid, and cinnamate. It has antioxidant, anti-inflammatory, and antibacterial properties and is used to treat diseases such as diabetes and cardiovascular disease. In folk medicine, cinnamon species have been used as medicine for respiratory and digestive disorders. Their potential for prophylactic and therapeutic use in Parkinson's and Alzheimer's disease has also been discovered. This review summarizes the available isolation methods and analytical techniques used to identify biologically active compounds present in cinnamon bark and leaves

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and the influence of these compounds in the treatment of disorders.Cinnamon is one of the most important tropical spices, which has different types of essential oils, bioactive compounds to help the human health in numerous ways. Cinnamic acid and cinnamaldehyde are the major derivatives present in this spice and possess antioxidants to combat several diseases and their complications. Antioxidants present in cinnamon possess valuable biological activities especially in fighting with the oxidative stress caused by free radicals. Therefore, bioactive compounds extracted from cinnamon could be used in the preparation of different types of traditional medicines and as supplements too.

Although many researchers have looked into the efficacy of cinnamon in improving metabolic parameters, there is no conclusive evidence on the efficacy of cinnamon. This systematic review aimed to systematically collect and combine the evidence from recent RCTs evaluating the efficacy of cinnamon supplementation in individuals with diabetes in order to provide the best evidence at present.

Methods:

We included studies done on patients with type-2 diabetes mellitus (DM) evaluating the effect of cinnamon supplementation on glycaemic control and blood lipid level. The criteria for including the studies for this systematic review are given in Table 1.

Table 1: Population, intervention, comparison, outcome and type of studies used in this systematic review on the efficacy of cinnamon in treating individuals with diabetes.

Population	Individuals with type 2-DM
Intervention	Cinnamon supplementation
Comparison	Without cinnamon supplementation
Outcome	*Primary outcome: Glycaemic control* *Secondary outcomes: Change in blood lipid and any side effects attributable to cinnamon supplementation*
Type of studies	RCTs
Research question	What are the effects of cinnamon supplementation in individuals with type-2 DM?

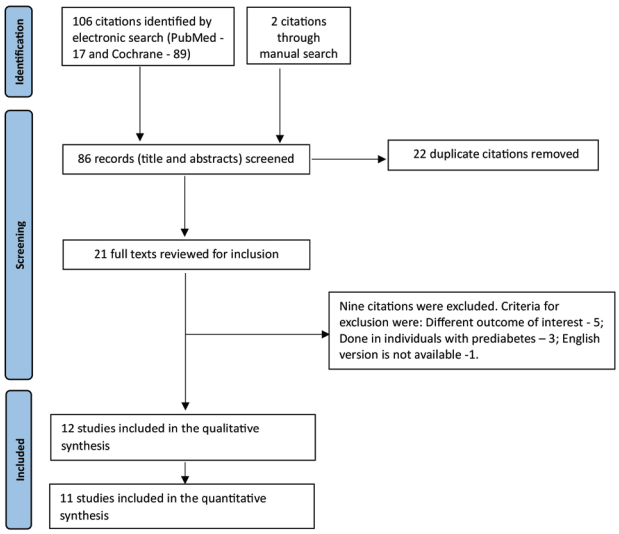
Search strategy: Search strategy was designed to identify studies evaluating the effects of cinnamon supplementation in patients with type-2 DM. We followed the guidance in the Cochrane Handbook for Systematic Reviews of Interventions and in PRISMA-S to plan and describe the search process for the review in order to minimize bias.

We conducted an electronic literature search to identify all the potential studies evaluating the effects of cinnamon supplementation in individuals with diabetes on the glycaemic control and lipid levels. We searched Cochrane Central Register of Controlled Trials and MEDLINE through PubMed. We adapted the literature search strategy to suit each database. We used both text words and medical subject heading terms. We included the studies published in English during the last ten years and as full text.

The following search strategy was used to search PubMed: (((cinnamon) OR (cinnamomum zeylanicum)) AND ((“Diabetes Mellitus”[Mesh]) OR (diabetes))) AND ((((((blood glucose) OR (blood sugar)) OR (HbA1c)) OR (lipid profile)) OR (cholesterol)) AND ((y_10[Filter]) AND (randomizedcontrolledtrial[Filter]) AND (humans[Filter]) AND (english[Filter])). We searched the reference lists of all included studies as well for any other potential studies. We identified multiple reports of the same study as a single study.

Selection of included studies: Two reviewers (KS and RS) independently screened the titles and abstracts for inclusion of all potential studies. Any disagreements between two reviewers were resolved by another reviewer (SR). Two reviewers (KS, RS) independently screened the full texts and identified the ‘studies for inclusion’ and ‘ineligible studies’. These reviewers recorded the reason for ineligibility. Any disagreements between two reviewers were resolved by another reviewer (SR). We recorded the selection process in sufficient detail to complete a PRISMA flow diagram (Fig. 1).

Fig.1: PRISMA flow diagram of the identification, screening and inclusion of studies evaluating the efficacy and safety of cinnamon in treating individuals with diabetes.



Data extraction and management: Once the studies were identified for inclusion the following data were extracted into a database: author's name; year of publication; study design, date of study, total duration of study; number of participants in the intervention arm and control arm, mean age, gender, dose and duration of cinnamon supplementation, change in blood sugar, HbA1c, total cholesterol, LDL, HDL and TG; funding for study and conflicts of interest of study authors. Two reviewers independently extracted outcome data from the included studies. One of the review authors copied the data from the data collection form into the RevMan Web and they were double checked by another reviewer.

Assessment of risk of bias in included studies: We used the 'Revised Cochrane risk of bias tool for randomized trials (ROB 2)' to assess the risk of bias of RCTs. We assessed the following domains: risk of bias arising from the randomization process, risk of bias due to deviations from the intended interventions, risk of bias due to missing outcome data, risk of bias in measurement of the outcome and risk of bias in selection of the reported result.

Strategy for data synthesis: A systematic narrative synthesis was carried out and the studies were summarized in text and tables. We used RevMan Web for analysis. Weighted Mean Differences were calculated to assess the changes in glycemic control and blood lipids using random-effect models along with 95% CIs. We did meta-analyses only if the treatments, participants and the clinical question were similar enough for pooling to be meaningful. If a trial had multiple arms, we included only the relevant arms.

We performed sensitivity analysis by removing one study at a time. We used I^2 statistic to measure heterogeneity among the studies and I^2 >50% was considered as significant heterogeneity. We based our conclusions only on findings from quantitative or narrative synthesis of studies included in this review.

Results:

Selection of studies: The search strategy was designed to identify the potential studies that evaluated the effect of cinnamon supplement in patients with diabetes. The search strategy identified 106 studies with the last search being done on the 31st of October 2024. There were 86 records after removal of duplicates. Screening of titles and abstracts was done and 21 studies were included for full text review. Twelve studies [7–18] and proanthocyanidins from cinnamon prevent in vitro formation of advanced glycation end products. Some human studies were equivocal, but several have shown beneficial effects of cinnamon supplementation on circulating glucose, lipids, and/or insulin. This placebo-controlled double-blind trial tested the effects of a dried water extract of cinnamon (Cinnamomum cassia meeting the criteria were identified and are included in this systematic review. The summary of this selection process is given in the PRISMA diagram (Fig.1). The characteristics of the included studies are summarised in Table 2.

Risk of bias in included studies: The risk of bias in the included RCTs is summarized in supplementary file (S1). According to the reviewers' assessment, eight studies had unclear bias at least in one domain.

Table 2: Description of the included studies

Ref	Type & period	Country	Sample size	Study population	Cinnamon supplement	Outcome
Anderson et al, 2015 [7]	Placebo-controlled double-blind trial	China	SG: n=64 CG: n=73	Type 2 DM not on insulin; Mean age- 61.3 ± 0.8 years; 47% were men;	Dried water extract of cinnamon 250 mg twice a day for two months	FBS and PPBS decreased significantly in the cinnamon extract-supplemented group compared to placebo group.
Bocha et al, 2022 [8]	Open label randomized control trial; (2021 – 2022)	Pakistan	SG: n=20 CG: n=20	Type 2 DM on Metformin; Mean age: 50.1 years; 87.5% were males.	Cinnamon capsule 250 mg twice daily for 12 weeks	Group which received cinnamon supplement had more reduction in FBS and HbA1c levels compared to control group.
Davari et al, 2020 [10]	Randomized, double blind, controlled clinical trial; (2016-2017)	Iran	SG: n= 20 CG: n=19	Type 2 DM; 25 -70 years; 61.6% were females;	3 g cinnamon daily for 8 weeks	The change in FBS and HbA1c after an eight week of intervention was not significantly different between the groups.
Gupta et al, 2017 [9]	Double blind randomized control trial; (2011 - 2012)	India	SG: n= 58 CG: n=58	Metabolic syndrome; Mean age 44.8 ± 7.8 years; 55% were males	Cinnamon 3g/day in 3 divided doses after main meals for 16 weeks	Significantly higher reduction in FBS and HbA1c and greater improvement in blood lipids were observed in the cinnamon group compared to placebo group.
Hendre et al, 2019 [11]	Randomized control trial	India	SG: n=100 CG: n=100	Type 2 DM on single drug for treatment; Age: 35 -65 years	500 mg of Cinnamon in capsule form daily for 3 months;	The reduction in FBS was significantly more in the cinnamon supplementation group than control group.
Lira et al, 2023 [12]	Randomized control trial	Brazil	SG: n= 71 CG: n=69	Type 2 DM, 18 - 80 years old, on oral hypoglycaemics (OHG)	750mg capsule two capsules, twice daily for 90 days	Cinnamon supplement seems to reduce LDL and increase HDL in individuals with diabetes.
Lira et al, 2022, [13]	Randomised placebo controlled, triple blind clinical trial	Brazil	SG: n= 71 CG: n=69	Type 2 DM, aged 18 to 80 years HbA1c > 6% and on OHG	750mg capsules (two capsules twice daily) for 90 days;	Reduction in FBS and HbA1c was significantly higher in cinnamon group compared to placebo group.
Mirfeizi et al, 2015 [14]	Randomized triple-blinded clinical trial; (2012 – 2014)	Iran	SG: n=30 (F-89%) CG: n=45 (F-75%)	Type 2 DM on OHG but not on insulin; 30-65 years of age	Cinnamon powder in capsule 500 mg twice a day for 90 days	The reduction in FBS, HbA1c and PPBS in Cinnamon supplementation group was not significantly higher compared to control group.
Sahib, 2016 [16]	Prospective, placebo-controlled randomized clinical trial	Iraq	SG: n=13 CG: n=12	Type 2 DM patients treated only with sulfonylurea; Mean age: 49.1 (±6);	Cinnamon powder in capsule 500 mg twice daily for 12 weeks	FBG reduced by 10.12% after 6 weeks and 17.4% after 12 weeks. This reduction was significant ($P \leq 0.001$) compared to baseline values and to placebo group at corresponding duration. HbA1c reduction in cinnamon group was not significantly different compared to baseline.
Sengsuk et al, 2015 [15]	Randomized, double-blind, placebo-controlled trial; (2012 – 2013)	Thailand	SG: n= 49 CG: n= 50	Type 2 DM for over 5 years, not on insulin therapy; 32% were males;	Cinnamon capsules 500 mg TDS after meals for 60 days	Cinnamon supplement reduced FBS, HbA1c and TG and increased HDL-C compared to placebo;
Talaei et al, 2017 [17]	Double blind randomized placebo -controlled trial	Iran	SG: n= 19 CG: n=20	Type 2 DM < 8 years on Metformin; Age: 25 – 70 years; BMI 18.5 to 30 kg/m^2	1000 mg of cinnamon after all three main meals for eight weeks	After 8 weeks the changes observed in FBS and HbA1c in study and control groups were not significantly different.
Zare et al, 2018 [18]	Randomized triple blind placebo -controlled trial	Iran	SG: n=70 CG: n=70	Type 2 DM on OHG; Age 30 – 80 years; BMI – 18.5 to 40 kg/m2	Cinnamon 500 mg powdered capsule twice a day for 3 months	Significantly higher reduction in FBS, PPBS and HbA1c of patients in study group compared to control group. There was significant reduction in TG, total cholesterol and LDL and increase in HDL

Primary outcome (Glycemic control):

Fasting blood sugar (FBS): Eleven studies [7–11,13–18]and proanthocyanidins from cinnamon prevent in vitro formation of advanced glycation end products. Some human studies were equivocal, but several have shown beneficial effects of cinnamon supplementation on circulating glucose, lipids, and/or insulin. This placebo-controlled double-blind trial tested the effects of a dried water extract of cinnamon (Cinnamomum cassia included in this review provided data on the effect of cinnamon supplement on FBS. Of these data from ten studies [7–11,13–15,17,18]and proanthocyanidins from cinnamon prevent in vitro formation of advanced glycation end products. Some human studies were equivocal, but several have shown beneficial effects of cinnamon supplementation on circulating glucose, lipids, and/or insulin. This placebo-controlled double-blind trial tested the effects of a dried water extract of cinnamon (Cinnamomum cassia could be included in the meta-analysis on the effect of cinnamon supplement on FBS (Fig. 2a). It showed that cinnamon supplementation was associated with significant reduction in FBS in 8-16 weeks (SMD = -12.04, 95% CI: -16.33 to -7.75, $p<0.05$). Study by Sahib [16] could not be included for quantitative analysis. However, this study also showed that there was significant reduction in FBS in the intervention group compared to control group. Sub-group analysis based on the dose (≤ 2g or >2g per day) of cinnamon showed that reduction in FBS was seen irrespective of the dose of cinnamon (Fig. 2a).

These results remained unchanged when the analysis was restricted to the studies with low risk of bias and when sensitivity analysis was performed by removing one study at a time.

Post prandial blood sugar (PPBS): Five studies [7,9,11,14,18]and proanthocyanidins from cinnamon prevent in vitro formation of advanced glycation end products. Some human studies were equivocal, but several have shown beneficial effects of cinnamon supplementation on circulating glucose, lipids, and/or insulin. This placebo-controlled double-blind trial tested the effects of a dried water extract of cinnamon (Cinnamomum cassia with extractable data on the effect of cinnamon on PPBS were included in the meta-analysis to find the effect of cinnamon supplement on PPBS (Fig. 2b). This analysis showed that cinnamon supplementation was associated with significant reduction in PPBS at 8-16 weeks (SMD = -11.14, 95% CI: -16.57 to -5.71, $p<0.05$).

HbA1c: Nine [8–10,13–18]in Karachi, Pakistan from December 2021 to May 2022 Materials and Methods: In total, 40 newly diagnosed type II diabetic patients were enrolled using the sequential sample technique from December 2021 to May 2022 (12 weeks for each patient of the included studies have looked into the efficacy of cinnamon in reducing HbA1c and four [10,14,16,17] of them reported that there was no significant difference in HbA1c in the cinnamon supplementation arm compared to control arm. But when the data from five studies [8,9,13,14,18]in Karachi, Pakistan from December 2021 to May 2022 Materials and Methods: In total, 40 newly diagnosed type II diabetic patients were enrolled using the sequential sample technique from December 2021 to May 2022 (12 weeks for each patient where cinnamon was supplemented for ≥ 12 weeks were pooled (Fig. 2c), it showed that cinnamon supplementation was associated with significant reduction in HbA1c (SMD = -0.26, 95% CI: -0.41 to -0.10, $p<0.05$).

Secondary outcomes:

Lipid profile: Five studies have provided data on the effect of cinnamon supplementation on blood lipids. Meta-analysis (Fig.3) showed that cinnamon supplementation was associated with reduction in total cholesterol (SMD = -11.02, 95% CI: -19.62 to -2.42, $p<0.05$), LDL (SMD = -12.67, 95% CI: -18.5 to -6.84, $p<0.05$) and triglyceride (SMD = -18.53, 95% CI: -36.26 to -0.81, $p<0.05$). Cinnamon supplementation was also associated with an increase in HDL (SMD = 1.74, 95% CI: 0.7 to 2.78, $p<0.05$). When sensitivity analysis was done by removing one study at a time the effect of cinnamon supplementation on triglyceride level became not significant.

Adverse events related to cinnamon supplementation: Only five studies[7,9,13,15,18]and proanthocyanidins from cinnamon prevent in vitro formation of advanced glycation end products. Some human studies were equivocal, but several have shown beneficial effects of cinnamon supplementation on circulating glucose, lipids, and/or insulin. This placebo-controlled double-

blind trial tested the effects of a dried water extract of cinnamon (Cinnamomum cassia included in this systematic review provided data regarding any adverse events related to cinnamon supplementation. All these studies reported that there was no adverse event related to cinnamon supplementation.

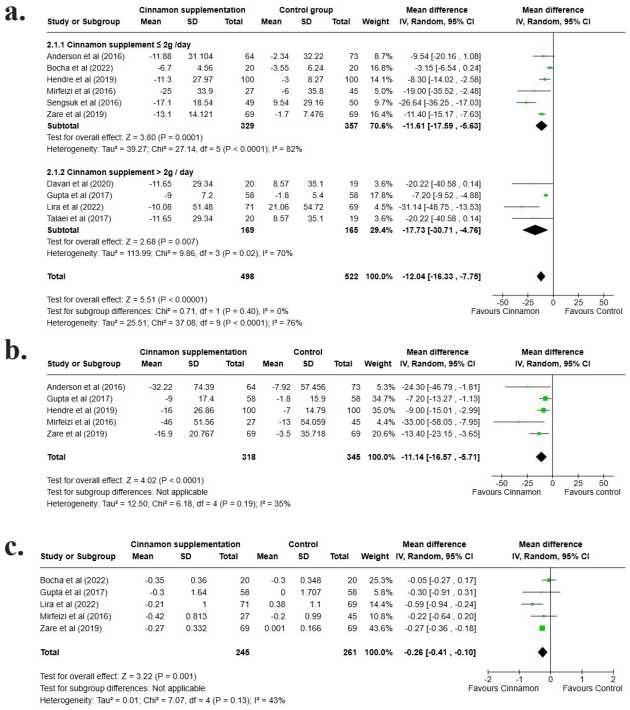
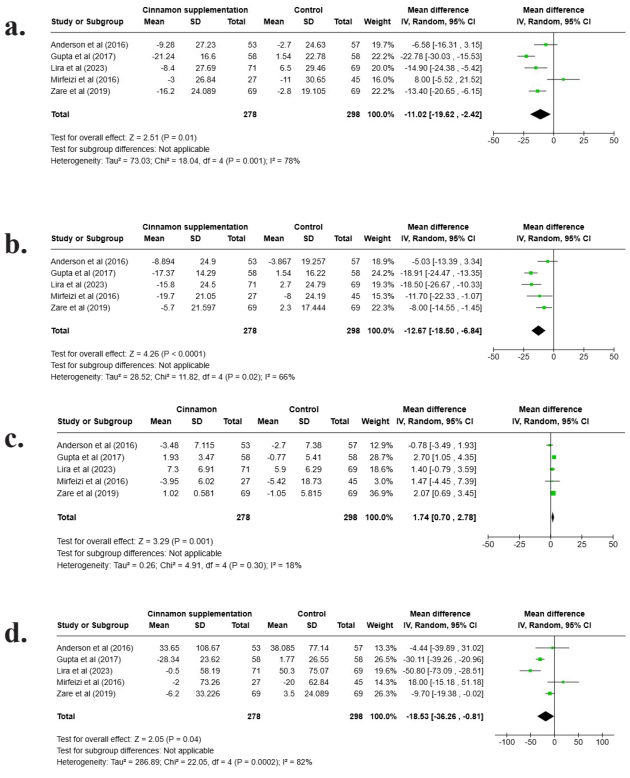


Fig.2: Forest plot for glycaemic control with cinnamon as compared to control in patients with type 2 diabetes mellitus: [a – Fasting blood sugar; b –Post prandial blood sugar; c – HbA1c]



Discussion

Prevalence of diabetes is rising at an alarming rate [19] prevalence, and burden of suffering of diabetes mellitus based on epidemiological data from the Global Burden of Disease (GBD and morbidity and premature mortality due to diabetes are major global health challenges [1]. Healthcare cost due to this is a major burden especially for low and middle income countries including in Sri Lanka [20]. Therefore, there is a need to look for cheaper and safer treatment options as complementary therapies.

Cinnamon is widely used as a complementary therapy in diabetes. A Cochrane systematic review by Leach et al [21]retinopathy, nephropathy, neuropathy, sexual dysfunction and periodontal disease. Improvements in glycaemic control may help to reduce the risk of these complications. Several animal studies show that cinnamon may be effective in improving glycaemic control. While these effects have been explored in humans also, findings from these studies have not yet been systematically reviewed.\nOBJECTIVES: To evaluate the effects of cinnamon in patients with diabetes mellitus.\nSEARCH METHODS: Pertinent randomised controlled trials were identified through AARP Ageline, AMED, AMI, BioMed Central gateway, CAM on PubMed, CINAHL, Dissertations Abstracts International, EMBASE, Health Source Nursing/ Academic edition, International Pharmaceutical Abstracts, MEDLINE, Natural medicines comprehensive database, The Cochrane Library and TRIP database. Clinical trial registers and the reference lists of included trials were searched also (all up to January 2012 in 2012 reported that there was no significant difference in glycaemic control in individual taking cinnamon supplement. Several RCTs have been published since then. Therefore, we did a SRMA of RCTs including studies published during the past ten years. This shows that cinnamon supplementation for 4-16 weeks along with standard therapy is associated with significant beneficial effects in patients with type-2 DM.

Our analysis showed that there is significant improvement of FBS and PPBS in the cinnamon supplementation group compared to control group. Meta-analyses by Zhou et al [22]PubMed, Embase, Medline, and

the Cochrane Library. To obtain standardized mean differences (SMDs, Namazi et al [23] and Moridpour et al [24] also showed a reduction in FBS in the intervention arm. However, these meta-analyses did not provide data on PPBS. The included RCTs in our SRMA used different doses of cinnamon ranging from 500mg to 3g per day. A sub-group analysis based on the dose of cinnamon supplementation showed that reduction in FBS was found irrespective of the dose of cinnamon used. This meta-analysis showed that there is improvement in the lipid profile as well with cinnamon supplementation. This finding is consistent with the other systematic reviews [25].

Published meta-analyses report controversial findings regarding the effect of cinnamon on HbA1c. Sub-group analysis based on the duration of supplementation and the level of HbA1c will provide better insights into this aspect. Our analysis showed that there is a small but significant reduction in HbA1c compared to control group when only the studies with ≥3 months of cinnamon supplementation were included. But this included only five RCTs with 245 individuals in the intervention arm. In the meta-analysis by Zhou et al [22] PubMed, Embase, Medline, and the Cochrane Library. To obtain standardized mean differences (SMDs a significant reduction in HbA1c was found when HbA1c was ≥8% although it was not found when HbA1c was <8%. Therefore, future studies should take these into consideration to confirm the effect of cinnamon supplementation on HbA1c.

Mechanism of action of the bioactive compounds of cinnamon which brings these beneficial effects is not clearly understood. It is found to upregulate $GLUT_4$ expression and glucose uptake [26,27]. It is also found to have anti-α-Amylase activity and anti-α-glucosidase activity and inhibit sucrase and maltase [26,27]. Bolin Qin et al reported that aqueous cinnamon extract regulates genes involved in insulin sensitivity, lipid metabolism and inflammation [28]. Cinnamon is found to reduce inflammation and provide antioxidant effects [2,6,28,29]but it has also been used in natural Eastern medicine. Cinnamon extracts are vital oils that contain biologically active compounds, such as cinnamon aldehyde, cinnamic alcohol, cinnamic acid, and cinnamate. It has antioxidant, anti-inflammatory, and antibacterial properties and is used to treat diseases such as diabetes and cardiovascular disease. In folk medicine, cinnamon species have been used as medicine for respiratory and digestive disorders. Their potential for prophylactic and therapeutic use in Parkinson's and Alzheimer's disease has also been discovered. This review summarizes the available isolation methods and analytical techniques used to identify biologically active compounds present in cinnamon bark and leaves and the influence of these compounds in the treatment of disorders.The composition of the volatiles from leaves of Cinnamomum zeylanicum Blume from Sri Lanka was studied by GC-FID and GC-MS. The basic component of the oil was found to be eugenol (74.9%. Cinnamon is also found to help in blood pressure control [30]but the results are controversial. Therefore, we conducted a systematic review and meta-analysis to provide a more precise estimate of the overall effects of cinnamon supplementation on blood pressure in adults.\nMETHODS: We searched PubMed, Scopus, Cochrane Library, ISI Web of Science, and Google Scholar databases through September 2019 to identify randomized clinical trials (RCTs and improving anthropometric parameters [31]. These will be additional benefits to the patients with diabetes and may delay the onset of long-term complications of diabetes.

Chemical composition varies depending on the species of cinnamon and the part of the plant. Since most of the studies did not specify the species of cinnamon and the parts of the plant used analysis could not be done to look into this aspect. Ceylon cinnamon which is known as "true" cinnamon, grows primarily in Sri Lanka [32] and this true cinnamon is reported to have high anti-oxidant effects. However, there is a scarcity of trials which used Ceylon cinnamon.

Cinnamon when used in small amounts as a spice or flavouring agent, is likely to be safe [32]. But it may cause side effects when used in high doses. Cinnamon contains Coumarin and hepatotoxicity due to coumarin is a concern in individuals who are at risk [33]. Only five studies included in this systematic review provided data on any adverse events and all these studies reported that there were no adverse events related to cinnamon supplementation. An umbrella review by Dan-Tong Gu et al [34] concluded that there is evidence to support that cinnamon supplementation has no adverse reaction.

However, possible adverse events should be evaluated in future studies especially when used in high doses for long duration.

Most of the studies have excluded pregnant mothers, patients with any long-term complications of diabetes and the patients on anticoagulants or aspirin. These should be taken into consideration when any recommendation is made regarding cinnamon supplementation.

Although a comprehensive search strategy was used in this systematic review, only two databases were searched. A sub-group analysis based on the dose of cinnamon was done. However, the other aspects of the cinnamon supplementation, including the duration, type of cinnamon and form of supplement could not be analysed. These are limitations of our meta-analysis. The dose and duration of cinnamon used varied widely which makes the preferred dose and duration of cinnamon supplementation unclear. The findings should be interpreted with caution due to the heterogeneity of the included studies.

Conclusions: Cinnamon supplementation is associated with an improvement in glycaemic control and lipid profile. These short-term beneficial effects of cinnamon in patients with type 2 diabetes looks promising. Further studies are needed to fill the gaps in current knowledge to make any recommendation.

Abbreviations

CG – Control group; FBS – Fasting Blood Sugar; OHG – Oral Hypoglycaemics; PPBS – Post Prandial Blood Sugar; RCT – Randomized controlled trial; SG – Study Group; SRMA – Systematic Review and Meta-analysis

Conflicts of interests

The authors declare that they have no competing interests.

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