Effect of chromium on glucose and lipid profiles in patients with type 2 diabetes; a meta-analysis review of randomized trials

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CRD summary
This review found that chromium lowered fasting blood sugar but did not affect glycated haemoglobin, lipids and body mass index in patients with type 2 diabetes. These conclusions appear to be reliable.

Authors' objectives
To assess the effect of chromium versus placebo on the glucose and lipid profiles of patients with type 2 diabetes mellitus.

Searching
PubMed, SCOPUS, Scirus, and IranMedex were searched from 2000 to 2012. Search terms were reported. Google Scholar was also searched

Study selection
To be eligible for inclusion, studies had to be randomised controlled trials (RCTs) of chromium intake (≥250μg) for at least three months) among patients with type 2 diabetes mellitus. Primary outcomes were glycated haemoglobin (HbA1c) and fasting blood sugar. Secondary outcomes were total cholesterol, high-density lipoprotein cholesterol, low-density lipoprotein cholesterol, very low-density lipoprotein cholesterol, triglyceride and body mass index.

In included trials, approximately half of the participants were men. Dose of chromium ranged from 400μg to 1000μg per day. Treatment duration was either three months or six months.

Two reviewers independently screened studies for inclusion in the review.

Assessment of study quality
The Jadad scale (based on randomisation, blinding and withdrawals) was used to assess trial quality. Points were awarded from 0 to 5, with trials scoring 2 or less deemed to be of low quality, and those scoring at least 3 to be high quality. Low quality trials were excluded from the review.

The authors did not state how many reviewers were involved in the assessment of study quality for the review.

Data extraction
Data were extracted to present effect sizes and 95% confidence intervals.

The authors did not state how data were extracted for the review.

Methods of synthesis
Effect sizes were pooled in a series of meta-analyses and 95% confidence intervals were presented for the relevant outcomes. Heterogeneity was assessed using the Q statistic. Where heterogeneity was observed, a random-effects model was used.

A funnel plot, together with Egger's test and Begg-Mazumdar Kendall's test, were used to indicate the presence of publication bias.

Results of the review
Seven RCTs were included in the review (387 patients, range 20 to 137). Four trials scored the maximum 5 points on the quality scale; one trial scored 4.

The effect of chromium on glycated haemoglobin in patients with diabetes was not statistically significant compared with placebo (-0.33, 95% CI -0.72 to 0.06; seven RCTs). There was statistically significant heterogeneity, but no
significant publication bias for this outcome.

Fasting blood sugar showed a statistically significant reduction with chromium compared with placebo (-0.95, 95% CI -1.42 to -0.49; six RCTs). There was no evidence of statistically significant heterogeneity and no evidence of publication bias for this outcome.

Chromium did not have a statistically significant effect on the secondary outcomes (full results reported in the paper).

Authors' conclusions
Chromium lowered fasting blood sugar but did not affect glycated haemoglobin, lipids and body mass index in patients with type 2 diabetes.

CRD commentary
This review was underpinned by clear inclusion criteria for patients, intervention, outcomes and study design. Searching comprised a small range of sources, but the authors assessed the potential for publication bias. Two reviewers were involved in selecting studies for the review, which helped to limit bias and errors. but similar measures were not reported for data extraction and quality assessment of studies in the review.

Trial quality was assessed, but the scale used had potential limitations (only generating a composite score). The meta-analyses appeared to be appropriate.

The authors' conclusions seem to be reliable.

Implications of the review for practice and research
Practice: The authors stated that the available evidence did not support the use of chromium for the management of type 2 diabetes as it only reduced fasting blood sugar.

Research: The authors did not state any implications for research.

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.