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Changing diet and physical activity to reduce gestational weight gain: a meta-analysis

*Gardner B, Wardle J, Poston L, Croker H***CRD summary**

The authors concluded that, overall, diet and physical activity change was effective in reducing gestational weight gain in pregnant women, but there was considerable heterogeneity in outcomes. The authors' conclusions reflect the evidence presented and are likely to be reliable, but the lack of reporting of review methods and substantial heterogeneity in the analysis should be borne in mind.

Authors' objectives

To evaluate the efficacy of psychological interventions aiming to improve diet or increase physical activity to prevent excessive weight gain in pregnant women.

Searching

PsycINFO, MEDLINE, EMBASE, AMED, HMIC, Cochrane Central Controlled Trials Register (CENTRAL) and HTA databases were searched to February 2010 for peer-reviewed articles published in English since 1990. Reference lists of previous reviews were scanned for additional articles.

Study selection

Controlled studies that evaluated the efficacy of a psychological intervention to improve diet and/or increase physical activity to prevent excessive weight gain in pregnant women (18 years or over) were eligible for inclusion. Studies had to report outcomes as self-reported or objective behaviour or weight gain prior to delivery. Studies that provided intervention information only, that were non-psychological or that included participants with known pre-pregnancy mental or physical health problems were excluded. The primary outcome was weight gain (kg) in pregnancy.

More than half of the trials were conducted in USA or Canada and the others were conducted in Europe. Most interventions included both diet and physical activity; one was of diet only. Most of the control groups provided standard care; the others provided educational booklets. Reported ages of participants ranged from 24 to 30 years.

One reviewer selected studies for inclusion. Ten per cent of records were assessed by a second reviewer independently.

Assessment of study quality

Study quality was assessed using some of the Cochrane validity criteria: allocation concealment, intention-to-treat analysis and losses to follow-up. Each criterion was assigned a score. The highest quality studies had a maximum possible score of 6. Other criteria were assessed but not scored and included randomisation, potential confounders and other sources of bias.

The authors did not state how many reviewers assessed study quality.

Data extraction

Data for relevant outcomes were extracted using a coding framework. Mean and standard deviations for each group were extracted for weight gain (kg) and used to calculate effect sizes and corresponding 95% confidence intervals (CIs). Study authors were contacted for further information relating to the intervention.

Two reviewers independently extracted 50% of data from each study. Disagreements were resolved through discussion.

Methods of synthesis

Weighted mean differences (WMD) and 95% CIs were calculated using an inverse variance fixed-effect model. Heterogeneity was assessed using χ^2 and I^2 . An I^2 of more than 50% was considered moderate heterogeneity and more than 75% was high heterogeneity. Subgroup analyses were conducted for sample characteristics, intervention content and delivery, methodological characteristics and behaviour change techniques. Publication bias was assessed by visual inspection of funnel plots.

Results of the review

Ten articles that reported 12 trials of 11 interventions (1,656 participants, range 21 to 560) were included in the review. Seven studies were randomised controlled trials (RCTs), two were quasi-experimental controlled trials, two were historical cohort studies and one trial used a time-series design. None of the studies scored the maximum 6 points for quality. Only one trial clearly reported allocation concealment. Three studies reported an intention-to-treat analysis. Losses to follow-up ranged from zero to 39%.

Behavioural interventions were more effective in reducing gestational weight gain than control groups (WMD -1.19 kg, 95% CI -1.74 to -0.65; 12 trials). There was evidence of moderate heterogeneity and no evidence of publication bias for this analysis.

Results for weight gain were similar for RCTs and non-RCTs (WMD -1.22 kg, 95% CI -2.48 to 0.04 for RCTs and WMD -1.19 kg, 95% CI -1.79 to -0.58 for non-RCTs), but the authors reported that sample size discrepancies made the results for RCTs non-significant.

Results for other moderating effects (such as sample characteristics, intervention content and delivery, methodological characteristics and behaviour change techniques) were reported.

Authors' conclusions

Analysis showed that, overall, diet and physical activity change was effective in reducing gestational

weight gain, but there was considerable heterogeneity in outcomes. Failure to evaluate changes in behaviour or its psychological determinants and under-reporting of intervention content may obscure identification of the processes by which weight change is effected.

CRD commentary

The review question was clearly stated. Inclusion criteria were reported. Several relevant sources were searched. Inclusion of only peer-reviewed articles in English risked publication and language bias, but formal assessment of publication bias did not find any evidence of this. Quality assessment was conducted and results for individual studies were reported. Reviewer methods to select studies and extract data were not conducted entirely independently, so there was potential for error and bias. Methods used to assess quality were not reported. Moderate heterogeneity was found for the overall analysis and it may have been more appropriate to use a random-effect model for this analysis. Subgroup analyses were conducted to explore moderators of effect.

The authors' conclusions reflect the evidence presented and are likely to be reliable, but the lack of reporting of review methods and substantial heterogeneity in the analysis should be borne in mind.

Implications of the review for practice and research

Practice: The authors did not state any implications for practice.

Research: The authors stated that future research evaluations should adequately specify intervention elements (through online study protocols if appropriate), use standard definitions for behaviour change techniques, assess behavioural outcomes, specify psychological theory mechanisms a priori and consult scientific theory to select, apply and evaluate interventions.

Funding

None stated.

Bibliographic details

Gardner B, Wardle J, Poston L, Croker H. Changing diet and physical activity to reduce gestational weight gain: a meta-analysis. *Obesity Reviews* 2011; 12(7): e602-e620

PubMedID

[21521451](#)

Original Paper URL

<http://onlinelibrary.wiley.com/doi/10.1111/j.1467-789X.2011.00884.x/abstract>

Indexing Status

Subject indexing assigned by NLM

MeSH

Behavior Therapy; Diet; Female; Health Knowledge, Attitudes, Practice; Humans; Motor Activity; Obesity /prevention & control; Pregnancy; Randomized Controlled Trials as Topic; Weight Gain

AccessionNumber

12011004141

Database entry date

20/03/2012

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.