
Behavioural interventions for obese adults with additional risk factors for morbidity: a systematic review of effects on behaviour, weight and disease risk factors

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CRD summary

This well-conducted review of behavioural interventions (diet and/or physical activity) in obese adults with at least one additional morbidity risk factor found modest intervention effects on behaviour, weight loss and risk factors; combination interventions generally caused the largest changes. Given the limited quality of included studies and heterogeneity in pooled outcomes, the author's conclusions should be interpreted with caution.

Authors' objectives

To assess the effects of behavioural interventions for obese adults with additional risk factors for morbidity on behaviour (diet and physical activity), weight and disease risk factors.

Searching

MEDLINE, EMBASE and PsycINFO were searched from inception to January 2008. A comprehensive search strategy was used. There were no language restrictions. International Journal of Obesity (1987 to May 2006), Obesity Research (2000 to May 2006) and International Journal of Behavioural Medicine (2000 to May 2006) journals were handsearched. References of relevant review articles and all included studies were searched for further studies.

Study selection

Studies were eligible if they were randomised controlled trials (RCTs) with at least 12 weeks of follow-up that studied adults with a mean/median body mass index (BMI) of 30kg/m² or more, a mean/median age of 40 years or more and at least one additional risk factor for morbidity. Interventions had to be behavioural interventions aimed at changing diet and/or physical activity. Outcomes included behavioural outcomes, weight and risk factors (total cholesterol, low density lipoprotein (LDL) cholesterol, high density lipoprotein (HDL) cholesterol, triglycerides, blood pressure, glycated haemoglobin (HbA1c), fasting plasma glucose).

Most of the included studies were conducted in USA; others came from Canada, UK, Australia, Finland and the Netherlands. About half of the studies examined participants with type 2 diabetes; others included participants with risk factors such as hypertension, impaired glucose tolerance and cardiovascular disease. Eleven studies were in women only. Mean age (standard deviation (SD)) of participants was 55±6.8 years. Mean BMI (SD) was 33.1±2.2 kg/m².

Interventions aimed at both diet and physical activity behaviour were used in 75% of studies, 14% of the studies were focused on diet only and 11% were focused on physical activity only. Of 51 dietary treatment arms, 20 provided general healthy eating advice and 30 used prescribed diets (reduced calorie, low fat, Weight Watchers, Ornish). Physical activity interventions included physical activity recommendations and supervised exercise classes and groups. Most studies compared interventions against usual care or waiting list controls and a small number compared against less intensive interventions. Study duration ranged between two and 36 months (mode six months). Follow-up ranged from three to 36 months (mode 12 months). Frequency of contact ranged from once every four months to twice a week (mean (SD) 4.6±6.5 times per month).

The first 200 references identified were screened independently by two reviewers and differences were resolved by discussion; the remaining references were screened by one reviewer.

Assessment of study quality

Standard criteria (randomisation, description of withdrawals, intention to treat analysis, blinding of outcome assessment) were used for assessment of the quality of the RCTs.

The authors did not report how many reviewers performed validity assessment.

Data extraction

Three reviewers extracted data for an initial three studies and differences were resolved by discussion. The remaining data extractions were done by one reviewer. Interventions were classified as diet only, physical activity only and diet and physical activity. Dietary and physical activity outcomes were analysed as standardised mean differences (SMD). Kilocalories, weight and disease risk factors were analysed as mean differences. Intention-to-treat data were used where possible. Values were reported with 95% confidence intervals. Missing values were imputed using a recognised method.

Methods of synthesis

Data were combined in a meta-analysis, where possible using the random-effects model. Heterogeneity was assessed using the I² method.

Results of the review

Forty-four studies were included. The mean (SD) number of participants was 240±502 (range 26 to 3,234). Nineteen of the 44 studies reported adequate randomisation and allocation concealment methods. Most studies reported numbers of withdrawals, but only about half gave reasons for withdrawal. Twenty-five studies used intention-to-treat analysis. Twelve studies used blinding of outcome assessment.

In studies that focused on both diet and physical activity, significant differences in kilocalorie intake in favour of the intervention were seen at 12, 18 and 36 months (-107 kcal, 95% CI -196 to -18 at 36 months). Similarly, significant differences in fat intake in favour of the intervention groups were seen up

to 24 months (SMD -1.0, 95% CI -1.7 to -0.4 at 24 months). Significant differences in physical activity in favour of the intervention groups were seen up to 24 months (SMD 0.4, 95% CI 0 to 0.8 at 24 months). Significant decreases in kilocalorie and fat intake compared to control were also seen in studies that focused on diet only and significant increases in physical activity compared to control were seen in trials that focused on physical activity only. Results for comparisons in behaviour change between more and less intensive interventions were mixed, with generally no significant difference seen.

Greatest changes in body weight compared to control were seen in the interventions that combined diet and physical activity (-2.6 kg, 95% CI -3.6 to -1.6 at 36 months). For diet-only interventions, significant weight differences were seen only up to 12 months. For physical activity interventions, significant weight differences were seen only at six months. There was a tendency towards greater decreases in weight with more intensive interventions (significant at 12 and 16 months for diet-only studies and at three months for combined interventions).

Favourable changes in risk factors were generally seen in groups that received combined interventions or dietary interventions only. Changes were less consistent in the physical activity only groups and there was no significant difference between more or less intensive interventions.

Moderate to substantial heterogeneity was found for a range of outcomes and at a range of time points.

Authors' conclusions

Behavioural interventions in participants with obesity and at least one further risk factor had a positive effect on behaviour, weight and disease risk factors that tended to be greatest around six months. Changes in behaviour were modest and tended to be greater in studies that focused on a single behaviour. Weight loss and changes in disease risk factors were greatest in studies that focused on both diet and physical activity.

CRD commentary

This systematic review addressed a clear research question and was supported by appropriate inclusion criteria. The literature search included relevant databases and supplementary searches and there were no language restrictions, which minimised the risk of language bias. Study selection and data extraction were done partly in duplicate. It was unclear whether validity assessment was done in duplicate. Reviewer biases and errors in this review processes could not be ruled out. Appropriate criteria were used to assess study quality.

Interventions were roughly subdivided into studies that focused on both diet and physical activity, diet only and physical activity only. No attempt was made to identify any other effective intervention components (such as exercise classes versus physical activity recommendation). Significant heterogeneity was reported, but not explored. Appropriate methods were used to pool the results. Many of the included studies had quality deficits. These included reliance of self-report measures for measuring behaviour change.

Given the limited quality of the included studies and heterogeneity in most pooled outcomes, the author's conclusions should be interpreted with caution.

Implications of the review for practice and research

Practice: The authors made no specific recommendations for practice.

Research: The authors stated that future research was needed to determine what particular aspects of behavioural interventions facilitated changes in behaviour and subsequent physiological changes. Future research should focus on identifying the most effective means of inducing dietary and physical activity behaviour change in populations with additional risk factors.

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Bibliographic details

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