Meta-analyses of workplace physical activity and dietary behaviour interventions on weight outcomes

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CRD summary
The authors of this review concluded that interventions that focused on improving physical activity and dietary behaviour were moderately effective in reducing body weight of employees and that adding an environmental component may reduce body weight further. The reliability of this conclusion is uncertain given limitations in the primary evidence and reporting of the review.

Authors' objectives
To critically evaluate the effectiveness of workplace interventions that targeted physical activity and/or dietary behaviour on weight outcomes. The focus of the review was prevention of weight gain/improved diet and exercise rather than weight loss in overweight patients.

Searching
MEDLINE, EMBASE, PsycINFO, The Cochrane Library, SPORTDiscus and Current Controlled Trials databases were searched for relevant studies published between 1980 and November 2009. Reference lists of relevant reviews and trials plus personal databases were searched for additional studies.

Study selection
Randomised controlled trials (RCTs) that targeted physical activity and/or dietary behaviour of employees, reporting any weight-related outcome measure, such as body weight, body mass index (BMI), body fat percentage, waist circumference, waist-hip ratio and sum of skin folds) were eligible for inclusion in the review. Interventions aimed solely at overweight subjects (BMI≥25kgm$^2$) were excluded.

Where described, studies evaluated interventions in white collar and blue collar careers. Participant age ranged from 18 to 67 years. Included interventions typically included a health risk assessment, an educational/informational component, a behavioural component, an exercise programme or an environmental component. Length of follow-up ranged from six weeks to six years.

Two reviewers independently selected studies for inclusion; any disagreements were resolved by a third reviewer.

Assessment of study quality
Twelve criteria for assessing methodological quality were derived from the Cochrane Handbook for Systematic Reviews of Interventions. The original Cochrane criterion for blinding of intervention providers was not used. Three criteria (timing of outcome assessments, adequacy of data analysis and data collection methods) were added. The number of criteria met was used to give each RCT an overall rating of excellent (10 to 12 criteria met), good (7 to 9 criteria), fair (5 to 6 criteria) or poor (zero to 5 criteria).

Criteria were applied independently by two reviewers. A third reviewer resolved disagreements.

Data extraction
The number of patients in each treatment/control group, within-group mean differences from baseline and standard deviations were extracted for each weight-related outcome.

Two reviewers independently extracted data; disagreements were resolved by a third reviewer.

Methods of synthesis
For each outcome, a pooled weighted mean difference (WMD) and related 95% confidence interval (95% CI) was calculated using a random-effects model. The level of heterogeneity in each comparison was described using the $I^2$ statistic. Funnel plots were used to assess potential for publication bias. Subgroup analyses of intervention type were
presented. These were interpreted using the GRADE approach for methodological quality, consistency, directness and precision of results, and potential for publication bias. A positive effect was defined as a 20% difference between groups.

**Results of the review**

Forty-three RCTs were included in the review: one was rated excellent for methodological quality, 11 were rated good, 11 were rated fair and 20 were rated poor.

Workplace interventions that targeted physical activity and dietary behaviour reduced body weight significantly (WMD -1.19kg, 95% CI -1.64 to -0.74, I²=71%; nine RCTs, 4,514 participants), BMI (WMD -0.34kg/m², 95% CI -0.46 to -0.22, I²=59%; 11 RCTs, 4,638 participants) and body fat percentage calculated from sum of skin folds (WMD -1.12%, 95% CI -1.86 to -0.38, I²=43%; three RCTs, 368 participants).

Low-quality evidence on workplace interventions that targeted physical activity alone reported significant reductions in body weight (WMD -1.08kg, 95% CI -1.79 to -0.36, I²=0%; five RCTs, 283 participants) and BMI (WMD -0.5kg/m², 95% CI -0.65 to -0.34, I²=0%).

None of the RCTs targeted dietary behaviour alone.

Where available, effects on percentage body fat calculated from bioelectrical impedance or hydrostatic weighing, waist circumference, sum of skin-folds and waist-hip ratio were presented. Subgroup analyses showed a greater reduction in body weight for physical activity and diet interventions that contained an environmental component.

**Authors’ conclusions**

This meta-analytic review showed that interventions that focused on improving physical activity and dietary behaviour were moderately effective in reducing body weight of employees and that adding an environmental component may reduce body weight further.

**CRD commentary**

This systematic review was based on a broad question that was supported by appropriate inclusion criteria. Attempts were made to identify all relevant studies and data and to minimise potential for errors and bias throughout the review process. The conclusions were informed by the methodological quality of the included evidence.

Although 43 RCTs were included in the review, only 22 provided data for the meta-analysis. For physical and dietary interventions, there was substantial variation between studies in terms of professions, setting, interventions content and length of follow-up that may have contributed to the observed variability in certain outcomes.

The review was restricted to RCTs. The objective of the RCT design is to ensure that the treatment and comparison groups are balanced in terms all relevant characteristics. The review authors stated that they extracted only within-group weight changes because of differences between groups, which suggested that randomisation had failed in these studies. The authors did not appear to present the between-group differences at follow-up for those RCTs that they considered to be free from important differences between groups. These limitations make the reliability of the authors’ conclusions uncertain.

**Implications of the review for practice and research**

**Practice:** The authors stated that these studies supported use of physical activity and dietary behaviour interventions with an environmental component to prevent weight gain among employees.

**Research:** The authors stated that future research should focus on the addition of environmental opportunities and other components to behavioural strategies. Future studies should report waist circumference, waist-hip ratio and sum of skin-folds outcome measures. RCTs should report randomisation procedures, blinding, cointervention and intention-to-treat analysis.

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