

## Effectiveness of monetary incentives in modifying dietary behavior: a review of randomized, controlled trials

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### CRD summary

The authors concluded that monetary incentives show potential for changing dietary behaviour but further research is required. Review methods were inadequately reported but, overall, the authors' cautious conclusion appears to follow from the results presented.

### Authors' objectives

To evaluate the effects of monetary incentives on dietary behaviour.

### Searching

MEDLINE, EMBASE, CINAHL, PsycINFO, the Cochrane Controlled Trials Register and the Cochrane Library were searched from inception to 2005 (April 2005 for most databases); the search strategy was reported. In addition, the reference lists of the included studies and other publications by major authors in the field were screened. Only studies published in English were included.

### Study selection

#### Study designs of evaluations included in the review

Randomised controlled trials (RCTs) were eligible for inclusion in the review.

#### Specific interventions included in the review

Studies that evaluated interventions in which monetary incentives were a central element were eligible for inclusion. Studies that evaluated incentives used primarily to increase recruitment/participation and multi-component interventions in which the incentive component was not separately evaluated were excluded. All of the included studies were set in the USA. The studies evaluated a range of interventions aimed at reducing financial barriers (using coupons at farmers' markets, price discounts or free food) or rewarding desired behaviour or dietary (weight loss) outcomes; details of specific interventions were reported. The duration of the interventions ranged from 2 to 12 months.

#### Participants included in the review

Studies of community-based populations were eligible for inclusion. Studies of participants who were hospitalised or living in institutions were excluded. The primary studies included a variety of male and female participants recruited through newspaper advertisements, convenience samples of schools and worksites with vending machines, and low-income females on nutritional assistance programmes.

#### Outcomes assessed in the review

Studies that reported food purchases and consumption, weight loss, or anthropomorphic or dietary measures were eligible for inclusion. The included studies evaluated changes in body mass index (BMI), weight, fruit and vegetable intake, farmers' market attendance and vending machine sales of low-fat snacks. One study reported self-reported outcomes.

#### How were decisions on the relevance of primary studies made?

One reviewer screened titles and abstracts. Any studies of doubtful relevance were referred to a second reviewer and any differences between reviewers were discussed.

#### Assessment of study quality

The authors did not state how the validity assessment was performed. Study validity used the following criteria: assessment of baseline characteristics; randomisation; concealment of allocation; blinding; follow-up; and intention-to-treat analysis.

#### Data extraction

The data were extracted onto a standardised form, but the authors did not state how many reviewers performed the data extraction. For each study, baseline and end-point outcome data were extracted.

#### Methods of synthesis

##### How were the studies combined?

The studies were combined in a narrative. Each study was described in the text and additional descriptive information was tabulated.

##### How were differences between studies investigated?

Differences between the studies were discussed in the text.

#### Results of the review

Four RCTs (1,039 participants recruited for 3 RCTs, the fourth study was based in 12 schools and 12 worksites) were included.

Methodological limitations of the studies related to small sample sizes (in view of the multiple interventions evaluated), lack of power calculation, randomisation method, allocation concealment, blinding, confidence intervals for results data and the use of self-reports.

One study (202 overweight adults) reported that the following interventions reduced BMI at 18 months compared with control: standard behavioural treatment (SBT), SBT plus free food, SBT plus monetary incentives, and SBT plus food plus monetary incentives; the reductions in BMI were 1.75, 2.49, 1.49 and 2.31 kg/m<sup>2</sup>, respectively, versus 0.21 kg/m<sup>2</sup> for the control group. Follow-up of 88% of the sample at 30 months showed weight changes from baseline of -1.4, -2.2, -1.6 and -1.6 kg, respectively, versus a 0.6-kg gain in the control group; this represented no significant difference between all active treatment combined and the control ( $p > 0.45$ ). One study (163 overweight adults) reported that the following combined interventions were associated with significant reductions in weight at 6 months compared with SBT alone: SBT plus structured meal plans and grocery lists, SBT plus meal plans plus partially funded

food, and SBT plus meal plans plus free food; the reductions in weight were 12.0, 11.7 and 11.4 kg, respectively, versus 8.0 kg for SBT alone. There were no significant differences between the three combined interventions. At 1-year follow-up, mean weight loss from baseline was less but remained significantly greater for combined interventions compared with SBT alone; 6.9, 7.5 and 6.6 kg, respectively, versus 3.3 kg for SBT alone ( $p < 0.02$ ).

One study (12 workplaces and 12 schools) reported that price reductions (10%, 25% and 50%) in low-fat snacks offered by vending machines were associated with a significant increase in the percentage of low-fat snack sales ( $p < 0.01$ ). The percentage increase in sales increased with the level of price reduction (9% with a 10% price reduction, 39% with a 25% price reduction and 93% with a 50% price reduction). Price reductions were also associated with a significant increase in the percentage of sales volumes of low-fat snacks ( $p < 0.01$ ).

One study (669 low-income females enrolled, 564 completed pre-test and 455 completed post-test questionnaires) reported that coupons for fruit and vegetables were associated with a significant self-reported increase in attendance at farmers' markets ( $p < 0.001$ ) and intake of fruit and vegetables ( $p = 0.04$ ).

#### **Authors' conclusions**

Monetary incentives show potential for changing dietary behaviour but further research is required.

#### **CRD commentary**

The review addressed a clear question that was defined in terms of the participants, intervention, outcomes and study design. Several relevant sources were searched but no attempts were made to minimise either publication or language bias; the reviewers acknowledged the potential for publication bias. Validity was assessed using specified criteria and the results of the assessment were reported. Only one reviewer screened all potentially eligible studies and this might have resulted in the omission of some relevant studies. The methods used to assess validity and extract the data were not described and so it is not known whether any efforts were made to reduce reviewer error and bias. In view of the differences between the studies, a narrative synthesis was appropriate and the methodological limitations of the studies were highlighted.

Review methods were incompletely reported but, overall, the authors' cautious conclusion appears to follow from the results presented.

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

**Practice:** The authors stated that there is a need to ensure that fiscal food policies minimise (or at least do not increase) existing inequalities of nutrition.

**Research:** The authors stated that there is a need for adequately powered, good-quality RCTs of appropriate duration to evaluate the effects of monetary incentives, particularly in socioeconomically disadvantaged and ethnically diverse populations. Studies should explicitly assess the cost-effectiveness of interventions and evaluate the effects of various price differentials. Future studies should adhere to the CONSORT (Consolidated Standards of Reporting Trials) guidelines.

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