A theoretically grounded systematic review of material incentives for weight loss: implications for interventions


CRD summary
This review developed a theoretical framework to distinguish classes of material incentive strategies for weight loss using evidence from 27 randomised controlled trials. Vote counting methods for assessing the effectiveness of material incentives concluded that utility could not be assessed. The limitations inherent in vote counting mean the reliability of the evidence is very low.

Authors' objectives
To develop a theoretical framework to distinguish classes of material incentive strategies for weight loss.

Searching
PubMed, PsycINFO, Business Source Premier and EconLit were searched from 1965 to 2011 using specified search terms. The search was restricted to publications in English. References of retrieved studies were searched and experts were asked to identify any additional pertinent studies.

Study selection
Randomised controlled trials were included if they enrolled adults (over 18 years), focused primarily on weight control and offered a material incentive contingent upon an outcome or behaviour. Incentives were in the form of non-cash rewards, lottery money or variable amounts of money for achieving different weight loss targets. Negative reinforcement was operationalised via deposit contracts or payroll deductions. Outcomes included weight loss and attendance at walking or educational sessions. Control groups varied (details provided in the review).

Interventions were categorised as positive or negative reinforcement on fixed-ratio or variable-ratio schedules (or combination interventions). No studies were identified on negative reinforcement variable-ratio schedules. One trial was conducted in Germany and one in Australia; the remaining trials conducted in the USA either in the workplace, community or Veterans Affairs. Intervention durations ranged from four weeks to 18 months. Where reported, participant age ranged from 13 to 70 years.

Two reviewers independently assessed study eligibility.

Assessment of study quality
No assessment of study quality was reported.

Data extraction
Information was tabulated into four incentive categories (positive fixed or variable ratio schedules, negative fixed ratio schedules and combination interventions) for each type of incentive.

Methods of synthesis
A narrative synthesis was used to describe the information within the four classes of incentive categories by type of incentive.

Results of the review
Twenty-seven RCTs (5,668 participants; range 10 to 2,041) were included in the review.

Positive reinforcement, fixed ratio schedule: Evidence on the efficacy of cash rewards was mixed (seven RCTs); benefits seen initially in two RCTs were not maintained at one and two year follow-up. Reinforcing attendance at education sessions in low-income women with coupons for fresh produce did not improve attendance or weight loss compared to controls (one RCT).
Positive reinforcement, variable ratio schedule: Two RCTs used entry into a lottery when participants achieved certain goals, but neither showed any benefit compared to controls. Similarly, one RCT which offered gifts to improve attendance at weight loss sessions did not show any benefit compared to controls. No follow-up data were available.

Negative reinforcement, fixed ratio schedule: Eleven RCTs assessed the efficacy of deposit contracts on weight loss and behaviour reinforcement, but the findings were conflicting and any initial weight loss was not maintained in the long term.

The two RCTs that examined the effectiveness of payroll deductions showed no differences in weight loss between intervention and control groups in the long term.

Combination interventions: Two RCTs reported no differences between treatment groups using combination incentives; three RCTs reported that combination incentives were more effective than control groups in producing weight loss, but the benefit was not maintained long term.

Authors’ conclusions
Definitive conclusions about the usefulness of material incentives for weight loss could not be drawn.

CRD commentary
This review addressed a clearly defined, but very broad question. Appropriate methods were used to minimise potential biases in the acquisition and selection of evidence. Subsequent review methods may have been appropriate for the development of a theoretical framework to distinguish classes of material incentive strategies for weight loss, but were inadequate for assessment of effectiveness. Study quality was not assessed so the internal validity of the evidence was unclear.

The authors justified the lack of meta-analysis with reference to the heterogeneity between studies. Narrative synthesis was germane in such circumstances, although quantitative methods for handling heterogeneous data do exist. However, the narrative discussion of heterogeneity was limited by poor conceptual definition of effectiveness. Details of the outcomes of the studies were not presented. Some studies examined weight loss whilst others measured surrogate behavioural change outcomes (attendance at walking or educational sessions). Where follow-up was reported, there was some evidence that weight loss was rarely sustained. Informal vote-counting procedures were used to summarise effectiveness, which does not take into account the precision of the study or the magnitude of effect estimates.

Therefore, the reliability of the evidence regarding effectiveness is very low.

Implications of the review for practice and research
The authors did not state any recommendations for practice.

Research: The authors stated that future research should compare the effects of incentives across socioeconomic groups using direct comparisons measuring long-term weight loss.

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