Maintaining Weight Loss: A Look at Habits

Gina Cleo

*MNutr&Diet (Hons Class 1), Accredited Practicing Dietitian*

Centre for Research in Evidence Based Practice
Faculty of Health Sciences and Medicine

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Dr Rae Thomas, Professor Paul Glasziou & Professor Liz Isenring

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Thesis summary

Background: The prevalence of overweight and obesity continues to gradually increase each year with worldwide obesity recorded to be more than double since 1980. Despite the significance placed on lifestyle interventions for obesity management, most weight loss is followed by weight regain. In fact, people who have lost weight on lifestyle programmes, regain approximately 40% of the weight they lose in the first year after losing it and much of the rest in the following three years. Recently, psychological concepts of habitual behaviour and automaticity have been suggested as plausible explanations for this overwhelming lack of long-term weight loss success. Consequently, habit-based interventions are becoming a novel and emerging strategy to help reduce excess weight in individuals with overweight or obesity.

Aims: This thesis aimed to determine the efficacy of habit-based interventions for weight loss and weight loss maintenance in adults with overweight or obesity.

Methods: Four interrelated studies were conducted using a variety of research methods. Firstly, a formative literature review collated and describe the current evidence on weight management interventions including the role of habits in weight loss maintenance. Secondly, a randomised controlled trial assessed the efficacy of two habit-based interventions on weight loss and weight loss maintenance. This was followed by a qualitative study using semi-structured interviews to explore the general experience of a sub-sample of participants from the two-habit-based interventions implemented in the RCT. Lastly, we conducted a systematic review and meta-analysis to determine the weight loss and weight loss maintenance outcomes of habit-based interventions compared with active and non-active control groups.

Results: The initial study found that habit-based interventions show promising results in sustaining behaviour change. Weight loss maintenance may benefit from incorporating habit-focused strategies and should be investigated further. The RCT included 75 adults with a mean BMI of 34.5kg/m² (SD 6.2). After a 12-week intervention period, participants in the habit-based programs lost significantly more weight (combined mean -3.1kg) than those in the waitlist control group (-0.4kg) (P= <0.001). At 12-months post-intervention, participants in the habit-based interventions maintained their weight loss and achieved further weight loss (combined mean from baseline -5.1kg), with 65% (28/43) of participants reducing their total body weight by ≥5%; a clinically important change. The third study revealed five key themes relating the participants’ general experience on the habit-based weight loss programs: (i) novelty of interventions and outcomes, (ii) convenience and practicality, (iii) indirect health benefits and wellness, (iv) accountability and (v) sustained behaviour change. Participants reported a positive experience whilst on the habit-based programs, highlighting it was refreshing to not
focus on diet and exercise. Participants also reported that the benefits continued long after the interventions had concluded; these included weight loss maintenance, general wellbeing, self-efficacy and sustained behaviour change, among others. Finally, the systematic review included five trials (630 participants) and showed a statistically significant difference in weight loss outcomes between habit-based interventions (range 8-14 weeks duration) and control groups (-1.4kg [95% CI -2.3, -0.5; P= 0.004]). Participants in the intervention groups were 2.4 times more likely to achieve clinically beneficial weight loss post-intervention than control participants. The was no statistically significant difference however at follow-up (range 6-24 months post-intervention), when we compared habit-based interventions with active control groups (-0.1kg [95% CI -2.5, 2.4; P= 0.96]). When observing single-armed results, four of the five included studies showed that habit-based interventions were successful at achieving weight loss maintenance.

**Conclusions and Implications**: The results of these studies highlight that habit-based weight loss programs are more effective at achieving clinically beneficial weight loss than lifestyle advice, non-habit based programs and waitlist groups in the short-term but these effects are not sustained when active weight loss programs are compared with habit-based programs over the long-term. Longer studies that are powered to examine at least a 12-month follow-up are required to evaluate weight loss maintenance. Habit-based programs are however practical and convenient for individuals to implement and offer a refreshing alternative to diet and exercise advice. Therefore, habit-based weight loss interventions offer health professionals and clinicians a useful tool for incorporating evidence-based health promotion with individuals desiring sustained benefits.

**Keywords**
Habit change, habit-based interventions, obesity, overweight, weight loss maintenance, weight management, automaticity, behavioural flexibility, habits
Statement of Authorship

This thesis is submitted to Bond University in fulfilment of the requirements of the degree of Doctor of Philosophy by Research (PhD).

I declare that the research presented within this thesis is a product of my own original ideas and work, and contains no material which has previously been submitted for a degree at this university or any other institution, except where due acknowledgement has been made.

Gina Cleo  
12th October 2017
Research outputs arising from this thesis

Peer-reviewed publications


Peer-reviewed conference abstracts: oral presentations


**International peer-reviewed conference abstracts: poster presentations**


Cleo G, Isenring E, Thomas R, Glasziou P. Could habits hold the key to weight loss maintenance? A randomised controlled trial. *International Conference on Obesity and Chronic Disease (ICOCD)*. 2017. San Francisco, CA, USA.

Ethics declaration

The research associated with this thesis received ethics approval from the Bond University Human Research Ethics Committee. Approval numbers RO1888 and RO1888b.

Financial declaration

This research was supported by an Australian Government Research Training Program Scholarship.

Copyright declaration

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Appendix A Peer-reviewed journal article: Could habits hold the key to weight loss maintenance? A narrative review. Journal of Human Nutrition and Dietetics. 2017; doi: 10.1111/jhn.12456

Appendix B National Health and Medical Research Council (NHMRC) Evidence hierarchy: designations of ‘levels of evidence’ according to type of research question

Appendix C Ten Top Tips informational leaflet and sample logbook (ticksheet)

Appendix D List of ‘expanders’ relevant to the self-classification questionnaire used to personalise the Do Something Different program

Appendix E Recruitment flyer used in the pilot study

Appendix F Bond University Research Ethics Committee (BUHREC) application for pilot study

Appendix G Participant information form and Registration form
Methodology and aims of studies

The core objective of this PhD is to determine whether habit-based interventions are effective at helping participants lose weight and maintain that weight loss for at least 12 months. In order to fulfil this main objective, four important investigations need to be explored: (a) what does the current literature report on the current state of overweight and obesity and what strategies are currently available; (b) what are the weight loss and weight loss maintenance outcomes from implementing a habit-based intervention; (c) what is the general experience of the individuals participating in the habit-based interventions - are habit-based interventions preferred over other conventional programs; and (d) how do habit-based programs compare with control groups when assessing weight loss and weight loss maintenance outcomes.

This PhD has four studies:

Study 1- Formative literature review
Study 2- Randomised controlled trial (pilot study and main study)
Study 3- Qualitative interviews with study participants
Study 4- Systematic review and meta-analysis of habit-based weight loss interventions

Chapter outline

- **Chapter 1** introduces the aetiology of overweight and obesity and collates, reviews and interprets how habitual behaviour plays a role in the lack of weight loss maintenance.

  Aim: the formative literature review aims to inform the direction of this PhD research.

- **Chapter 2** provides a detailed description of the two programs used in the subsequent randomised controlled trial. This chapter draws information from published trials that have used the interventions relevant to this PhD.

  Aim: to outline the conceptual theories and methodological procedures of the interventions used in study 2 (RCT).

- **Chapter 3** describes a 4-week pilot study, conducted to assess the feasibility and acceptability of the 2 interventions used in the subsequent randomised controlled trial.

  Aim: to determine if the two interventions used in this PhD are feasible to implement and do participants find them acceptable?
- **Chapter 4** presents the main 3-arm randomised controlled trial. This study included 75 participants with overweight or obesity. Participants were randomised to one of 2 habit-based interventions or a wait list control group. Active intervention participants were followed up 6 and 12-months post-intervention.

Aims: (1) determine whether habit-based weight loss interventions are clinically beneficial in achieving and maintaining at least 5% body weight loss over 12-months; (2) assess whether making new habits, or breaking old habits is more effective at weight loss maintenance 12-months post-intervention.

- **Chapter 5** comprises a qualitative analysis which was conducted with a subsample of participants from the main RCT.

Aims: (1) explore the general experience of participants in the TTT and DSD interventions; (2) discover whether the different interventions affected the participants’ behaviours and weight loss results (3) consider the acceptability and practical application of the two interventions as a method of process evaluation.

- **Chapter 6** presents a systematic review and meta-analysis examining the efficacy of habit-based interventions on weight loss and weight loss maintenance.

Aims: (1) assess the efficacy of habit-based interventions on weight loss and weight loss maintenance (2) determine if forming new habits or the combination of forming and breaking habits is more effective for weight loss and weight loss maintenance.

- **Chapter 7** synthesises these findings to form conclusions about the implementation of habit-based interventions as a strategy for weight loss and weight loss maintenance.

Aims: This chapter addresses the original research questions and discusses the results of the studies in a broader context. Recommendations for future research directions are also provided.