Australia's National
Science Agency

Summary of Findings: Long term weight loss

Understanding the success and challenges of CSIRO Total Wellbeing Diet members over a one-year period

Emily Brindal, Gilly Hendrie, Genevieve James-Martin, Danielle Baird, Paige Brooker, Gemma Williams, Kim Anastasiou

April 2023

Citation

Brindal, Hendrie, James-Martin, Baird, Brooker, Williams, Anastasiou (2023). Summary of Findings: Long term weight loss. Understanding the success and challenges of CSIRO Total Wellbeing Diet members over a one-year period. CSIRO, Australia.

Copyright

© Commonwealth Scientific and Industrial Research Organisation 2023. To the extent permitted by law, all rights are reserved and no part of this publication covered by copyright may be reproduced or copied in any form or by any means except with the written permission of CSIRO.

Important disclaimer

CSIRO advises that the information contained in this publication comprises general statements based on scientific research. The reader is advised and needs to be aware that such information may be incomplete or unable to be used in any specific situation. No reliance or actions must therefore be made on that information without seeking prior expert professional, scientific and technical advice. To the extent permitted by law, CSIRO (including its employees and consultants) excludes all liability to any person for any consequences, including but not limited to all losses, damages, costs, expenses and any other compensation, arising directly or indirectly from using this publication (in part or in whole) and any information or material contained in it.

CSIRO is committed to providing web accessible content wherever possible. If you are having difficulties with accessing this document please contact csiro.au/contact.

1 Introduction

The aim of this project was to describe the long-term weight loss experience of members on the CSIRO Total Wellbeing Diet, and better understand members' reasons for staying on the program, satisfaction with their results, and the key behaviours or challenges members felt had played an important part in their weight loss journey.

Studies of long-term weight maintainers suggest there are some common behavioural strategies associated with success, such as frequent self-monitoring of body weight and food intake, high levels of physical activity and following a low-fat diet. Studies also suggest that people who lose large amounts of weight and keep it off report that their success takes effort but that it is worth it, and that over time it gets easier to maintain weight loss.

The current study comprised of three parts:

1. A secondary analysis of data from the CSIRO Total Wellbeing Diet online platform to examine weight loss results beyond the initial 12-week program and explore common patterns of weight loss and platform usage associated with greater weight loss success.
2. An online survey to examine the perceived factors of success and strategies used by members, including their weight management strategies, self-monitoring behaviours, and engagement with the platform. It also explored psychological constructs associated with successful weight loss.
3. In-depth interviews with long-term successful CSIRO Total Wellbeing Diet members to gain greater insight into their experiences, including what led to their success, and any persistent challenges to being on a weight management journey for over a year.

The results of this study provide a greater understanding of impacts of the CSIRO Total Wellbeing Diet beyond the initial 12-week program, and the factors associated with long term behaviour change and establishment of lifelong habits. The results will be used to enhance the CSIRO Total Wellbeing Diet program and the experience for members.

2 Method

2.1 Part 1: Secondary analysis

2.1.1 Participants

Participants of this secondary analysis included all adults who joined the CSIRO Total Wellbeing Diet online and had data in the platform between October 2014 and June 2022 (n=157,255 referred to as members). In the registration and setup processes, individuals who were younger than 18 years of age or had a Body Mass Index (BMI) that placed them in the underweight category (BMI <18.5kg/m^2) were automatically excluded. Pseudo members (i.e. platform testers and affiliated staff) were removed from this analysis, as well as those whose membership was paid for by their employer, or people living outside of Australia.

2.1.2 Data collection

Information collected at the time of joining included date of birth, sex, ethnicity, postcode, as well as body measurements such as height, weight, and waist circumference, and program details such as paid membership duration and refund status. Members' usage of the platform's core features was captured, including entries into the food diary, views of the menu plans, views of exercise plans, views of program content information, forum visits, searches of the food database, and weight entries.

This data was provided to the CSIRO research team by SP Health in a de-identified format with each individual member assigned a unique identifier. Weigh-in data was provided for each member weekly from weeks 1-13, and then for each 13-week blocks thereafter until membership ceased. The latest recorded weight was provided for each 13-week block. Activity data (number of weigh-ins, food diary entries, menu plan views, exercise plan views, program content views, forum views, food search views, and total platform activity) was provided at similar timeframes.

Ethics approval was received from CSIRO Health and Medical Human Research Ethics Committee (2022_055_LR).

2.1.3 Data cleaning and management

All members missing a starting weight were removed because weight loss (the primary outcome) could not be calculated (n=2172). Additionally, 8 members were removed because their recorded weight value was deemed invalid/unreliable using cut off values of <13kg or >250kg. This left 155,075 members for analysis.

This analysis focused on *Stayers* who were defined as members with paid membership equal to or greater than 84 days (12-week program duration) AND the number of days between their first and last entered weight was equal to or greater than 77 days (provides one-week grace for first or last

weigh-in). A subsample of 61,514 members were categorised as stayers and were the focus of this analysis.

Weight loss from baseline (using starting weight) was calculated at week 12, 3 months, 6 months, 9 months, 1 year, 2 years and 3 years for members who were paid members at each time point of interest. Exploring the relationship between platform usage and longer-term weight loss success focused on members with weight loss data at 1 year, in order to have a reasonable sample for subgroup analysis.

2.1.4 Statistical analysis

Statistical analyses were performed using the IBM SPSS statistical software package version 23 (SPSS Inc., Chicago, IL, USA). Weight loss in kilograms and as a percentage of starting body weight were calculated. Weight loss was calculated at each of the time points of interest, and by subgroups including by sex, age group, starting weight status category (normal weight, overweight, obese (and by obesity class 1, 2 and 3), state of residence, quintiles of socio-economic disadvantage and duration of paid membership.

2.2 Part 2: Online survey

An online, largely quantitative, survey of CSIRO Total Wellbeing Diet members was conducted. The survey was sent to members who had completed at least 12 weeks of the program and signed up between June 2015 and March 2021, meaning they had time to have completed at least one year of the program.

Subgroups were constructed based on lifetime weight loss success to capture those who had little success, some success and those who have been very successful at losing weight. The cut offs for weight loss success were based on data from the US National Weight Control Registry, which suggests being at least 14kg lighter than maximum body weight is successful weight loss (Thomas et al (2014) Weight-loss maintenance for 10 years in the National Weight Control Registry - PubMed (nih.gov)).

Descriptive analysis examined members' weight loss journey and previous dieting attempts. Compliance with Total Wellbeing Diet principles when on the program, as well as current self-monitoring behaviours and lasting use of the Total Wellbeing Diet principles were examined. Linear regression was used to further understand the importance of various psychological factors for weight loss success, and predict members satisfaction with current weight, lifetime weight loss and duration of keeping lost weight off.

2.3 Part 3: Interviews

Participants who completed the online survey and reported to have lost at least 14kg of weight were invited to participate in the interview stage of the research. The first 15 people to complete the survey, opt in and accept the invitation participated in one-on-one, in-depth, semi-structured interviews, conducted over Webex.

Data from the interviews was transcribed verbatim and analysed qualitatively using a grounded theory approach. A coding structure was established by two researchers. NVivo software was used to conduct the analysis. This analysis explored personal experiences of long-term CSIRO Total Wellbeing Diet members and the perceived factors that have contributed to their ongoing engagement and success with the program.

The questions included:

- Talk to me about your weight loss journey.
- What made you decide it was time to lose weight?
- Was there a point where you felt successful?
- What is the best thing that has happened to you because of your weight loss?
- What are the key things you do that help you stay on track every day?
- How did you manage setbacks? Can you give me an example or any specific time and what happened and how that worked out for you?
- Do you think there is a difference between what you do to lose weight versus keep it off? Tell me more.
- Probe: How much effort do you think it takes? Does one feel more like success?
- What is something you know now that you wish you knew before you started?
- What is one thing you would tell other people starting out to help them do better?
- What do you think about exercise versus diet to manage weight loss?
- How much have you changed the Total Wellbeing Diet to suit your needs? What kind of things have you adapted?

Summary of results

Long-term weight loss results

Since launching in late 2014, the CSIRO Total Wellbeing Diet online has had a total of 154,656 unique members, of which 40% were considered "Stayers" (n=61,514). Stayers were those members who had paid for a membership for at least 12 weeks, and had a valid weight in the system at baseline and at 12 weeks or beyond.

For Stayers who had a valid weight in the system at baseline and 12 weeks (n=50,584/61,514; 82% of all Stayers), the average weight loss was 5.7kg (equivalent to 6.2% of starting body weight). For those with valid weight data in the system, the average weight loss from baseline at the longer time points were:

- 6.4kg or 6.9% of starting body weight for those with a valid weight at baseline and 6 months (n=33,481)
- 6.1kg or 6.4% of starting body weight for those with a valid weight at baseline and 1 year (n=10,211)
- 4.8kg or 5.1% of starting body weight for those with a valid weight at baseline and 2 years (n=2,804)
- 4.6kg or 4.8% of starting body weight for those with a valid weight at baseline and 3 years (n=1,053)

Among Stayers, 6,602 members had a valid weight in the system at baseline, week 12, 6 months, 9 months and 1 year, allowing pattern of weight loss over time to be explored (6,602/61,514=11%). This subgroup of members lost:

- 6.8kg, or 7.2% of starting body weight, during the 12-week program. 75% had achieved a clinically significant weight loss (defined as 5% body weight lost or more).
- 8.5kg, or 9.0% of starting body weight, after 6 months. 76% had achieved a clinically significant weight loss.
- 8.4kg, or 8.9% of starting body weight, after 9 months. 70% had achieved a clinically significant weight loss.
- 7.8kg, or 8.2% of starting body weight, after 1 year. 64% had achieved a clinically significant weight loss.

Within this subgroup of Stayers (n=6,602) who had data at each of the four time points within the first year of membership (12 weeks, 6, 9 and 12 months), the patterns of weight loss in 12-week blocks (the standard program length) were explored. Consistent with previous research, weight change within 1.4kg of previous weight was considered weight maintenance, and anything greater considered weight loss or weight gain. For each member a 4-digit code was assigned based on whether they lost weight (L), gained weight (G) or maintained their weight (M) within each 12-week block over the first year.

- Over the first year of membership, it was most common for members (14.6%, 961/6,602). to record a weight loss in the first two 12-week blocks of membership (i.e. first 6 months), and then maintain their weight in second two 12-week blocks of membership (9 months, 12 months). This group (L|L|M|M) lost an average of 10.6kg at 1 year (or 11.9% of their starting body weight).
- The second most common pattern was weight loss recorded in the first 12-week block and then maintenance for the remainder of the year. This group (L|M|M|M, 734/6602, 11.1% of this sample) lost an average of 5.1kg in 12-weeks (5.7% of their starting body weight) maintained through to 1 year. The other common pattern was weight loss during the first three 12-week blocks followed by weight maintenance (L|L|L|M, 590/6602, 8.9% of this sample). The group lost 16.6kg over 1 year, equivalent to 17.1% of their starting body weight.
- Although less common (L|L|L|L, 284/6602, 4.3% of this sample), the group of members who lost weight within each 12-week block were among the heaviest members at the start of the program and they lost an average of 22.3kg over 1 year, which was equivalent to 21.7% of their starting body weight.

Platform usage and weight loss

Members' usage of the platforms core features was captured, including entries into the food diary, views of the menu plans, views of exercise plans, views of program content information, forum visits, searches of the food database, and weight entries. There were significant positive correlations ($p<0.01$), of moderate strength, between total usage of the platform, and usage of several features, and total and percentage weight loss. The strongest correlations were between total platform activity ($r=0.364$) and percentage weight loss, food diary entries and percentage weight loss ($r=0.345$), and weigh ins and percentage weight loss ($r=0.252$).

Total activity within each 12-week block was higher in those members who lost 10% or more of their body weight in their first year of membership. For example, members who lost 10% or more of their starting body weight over 1 year, used the platform 50% more than those who lost less than 5% of their starting body weight over 1 year. After the first 12 weeks, platform usage of members who lost 10% or more over 1 year was more than double the usage of those who lost less than 5% of their starting body weight.

Members who lost 10% or more of their body weight in their first year used all the key platform features more often than other groups. The greatest difference during the first 12-week block was for menu plan views. Members who lost 10% of their body weight or more in their first year of membership viewed these plans 70% more than members who lost less than 5% of their starting body weight over 1 year. In fact, all the features around tracking food intake were higher over the year in members who lost 10% or more of their starting body weight. After the first 12 weeks, usage of the food diary was 2.5-3 times higher over the remainder of the year in members who lost 10% or more of their starting body weight over 1 year than those who lost less than 5% of their starting body weight. The usage of the food search function in members who lost 10% or more of their starting body weight over 1 year was also more than double that of those who lost

less than 5% of their starting body weight, and use of the menu views also remained higher in this group.

Success and challenges

The success and challenges of longer-term weight management were elicited from members through an online survey and in-depth interviews. There were some clear themes from both the survey and interviews about what it takes to be successful at weight loss maintenance. Some of these themes were expected – such as consistency, commitment, and practical advice around diet. One of the more novel themes discussed was vitality. From the survey data, vitality, defined as having positive energy, predicted greater lifetime weight loss, and those who achieved good weight loss over more than 2 years also reflected on the way their weight loss had improved their levels of energy.

Satisfaction with weight (in the survey results) as well as feelings of success (elicited through the interviews) were associated with reaching a comfortable, self-prescribed, set point weight which is likely to be closer to their lightest weight than the heaviest weight. From the interviews it appeared that this set point weight was derived from their personal experience and not informed by public health advice. The results of this research suggest that the amount of time that weight has been kept off (that is, length of maintenance) was more difficult to unpack and the regression models used to explain weight loss weren't able to explain this outcome as well. More research is needed to better understand more about what predicts weight loss in terms of the amount of weight lost, but also how long it is maintained. People who had lost more weight appeared to be more likely to have made it through a weight plateau and then continued to lose weight, so one's ability to get through a plateau may be critical, but more data are needed to understand these survey observations.

Tracking, a key form of self-monitoring, was again identified as an important behaviour associated with long-term weight loss success. Regular weigh-ins is important for weight loss success, and the interviews provided greater insight into how participants are willing to jump back on the scales to review their weight even when they know they have been a little off track. This willingness to weigh in during these times may be critical for weight loss maintenance as it allowed people to recalibrate and remain accountable. Another theme, supported by both the survey and the interview data, was the importance of people's ability to understand and adapt dietary principles into everyday eating. Members reported flexibility and adaptability to be a benefit of the Total Wellbeing Diet over other diets. In the interviews people spoke about the key to success of long-term weight management being about lifestyle change and being able to apply their knowledge of dietary principles of the Total Wellbeing Diet to suit their needs.

Aside from vitality, there were also recurring themes around psychological variables such as being ready, motivated, disciplined and doing it for the 'right reasons' as being important for success longer term.

Across the data analysis and survey findings, it was the individuals who were heavier and had more weight to lose that were more successful with their weight loss. These were also the people that stayed on the program for longer – most likely because they felt they had more weight to lose. Therefore, some of the results need to be interpreted cautiously as they may not relate as much to those weight who start the program with less weight to lose.

As Australia's national science agency and innovation catalyst, CSIRO is solving the greatest challenges through innovative science and technology.

CSIRO. Unlocking a better future for everyone.

Contact us

1300 363 400
+61 3 9545 2176
csiro.au/contact
csiro.au