

My Muscle Chef Study - Complete Personalised Weight Loss Program

An analysis of the effectiveness of a commercial personalised dietary weight loss program on weight loss in participants with obesity: A Controlled Trial

Abstract

Background: The effectiveness of personalisable commercial weight loss programs for long term for weight loss is unclear.

Aim: The aim of this study is to quantitatively and qualitatively evaluate the effectiveness of the My Muscle Chef Complete Personalised Weight Loss Program.

Design: This controlled trial measured participant weight-loss data from the My Muscle Chef Complete Personalised Weight Loss Program over a 4-week period. Participants were provided with 1:1 nutrition counselling sessions once per week as part of the program. Weight loss was analysed using percentage weight loss over 4 weeks, chest circumference and waist circumference measurements. A qualitative analysis was completed through video interviews with participants at the conclusion of each week of the program.

Results: Average weight loss amongst the cohort was 5.48kg ($p < 0.0001$). Overall males achieved a higher mean weight loss than females ($5.81\text{kg} \pm 1.21$ vs. $5.16\text{kg} \pm 1.03$ respectively) correlating to a higher initial starting weight ($105.14\text{kg} \pm 7.82$ vs. $99.14\text{kg} \pm 13.67$, respectively).

Conclusion: Findings from this study suggest that the personalisable My Muscle Chef Complete Personalised Weight Loss Program effectively achieves a significant weight loss result over a 4-week period in adult male and females ($p < 0.0001$).

1. Introduction

Obesity is a multifactorial disease which has grown into the most relevant overnutrition disease worldwide (1). While many reasons have been put forward as causes of obesity, the most likely remains as overnutrition, typical of a modern lifestyle (2). There is increasing evidence that people who develop obesity have an increased likelihood of developing chronic diseases including diabetes mellitus, cardiovascular disease (CVD), hypertension and mental health conditions (3).

Recent data from the Australian Bureau of Statistics (ABS) has indicated that approximately one in three Australian adults (31%) are obese (4). As an impact of the climbing prevalence in adult obesity, the proportion of the population desiring to lose weight is increasing (5). Despite this urge to reduce body weight and improve health, the influence of biological, behavioural, and environmental factors challenge this trajectory and the capacity for long term weight management (6). Hall et al. (2018) reported that whilst substantial weight loss is achievable via a range of interventions, more than 80% of weight loss is regained within five years post weight loss. For most, maintaining long term weight loss requires a multifactorial approach involving permanent lifestyle changes in eating and exercise behaviours, which for most is even harder to sustain following the weight loss phase (7).

Research suggests that effective weight management requires ongoing diet maintenance through a variety of macronutrients found in nutrient dense foods such as lean protein, carbohydrates, fruits and vegetables (6). Effective nutrition intervention often requires 1:1 dietary counselling to manage a personalised approach that can support sustainable weight loss. This approach to weight loss is known to promote a sustained level of satiety, energy regulation and fat loss without the loss of muscle mass (2). In recent years, commercialised dietary approaches including Very Low Calorie Diets (VLCD) have gained popularity and are commonly used to see quick weight loss results, as severe food restriction is associated with rapid weight loss. However these dietary methods are often not sustainable as a long term solution. There are very few studies that suggest commercial weight loss interventions have the potential to attain a degree of weight loss that is equivalent to professional 1:1 intervention from a dietitian, which allows for greater weight loss results to be achieved and maintained long-term (8).

Long term maintenance of weight loss requires ongoing attention to continue to yield positive results. The tendency of regaining weight post-intervention is often attributed to undertaking an unsustainable approach to weight loss or inability to consistently adhere to a change in lifestyle behaviours. Studies have demonstrated that having an ‘ongoing dieting’ approach despite no further weight loss can lead to gradual increases in appetite and caloric intake, as the individual remains constantly aware of restricted intake signalling the brain to increase appetite (6). Research suggests that understanding the psychological factors contributing to weight loss such as behavioural thinking patterns is able to improve the success of intervention. In recent studies the use of interventions to modify lifestyle behaviours such as being aware of intake through self-monitoring, goal setting and increased physical activity have been documented to support weight loss success (9).

When navigating commercial weight loss programs, it is known that a ‘one size fits all’ approach is less effective compared to an intervention that is prescribed based on individualised factors such as energy expenditure, activity levels and macronutrient requirements (7). At a commercial level, there is minimal evidence that suggests commercial weight loss interventions can achieve weight loss results that are equivalent to private 1:1 nutrition counselling (8). Therefore the aim of this study is to assess the effectiveness of the *My Muscle Chef Complete Personalised Weight Loss Program*; a personalisable commercial app-based weight loss program, in achieving significant and maintainable weight loss results through nutritional intervention and behavioural change.

2. Methods

2.1 Study Design

This controlled trial aimed to evaluate the effectiveness of the *My Muscle Chef Complete Personalised Weight Loss Program* in adults with obesity. The primary outcomes measured included average weight loss and change in body measurements including chest circumference and hip circumference in males and females over a 4-week period. The secondary outcomes included a qualitative analysis of behaviour change across themes including weight loss, energy improvement, appetite improvement, habit development, craving control and ease of program related to success.

2.2 Participants

Twenty-nine subjects were enrolled in the study (15 females and 14 males). From this group, 3 (2 female and 1 male) dropped out or were excluded from the trial due to non-adherence (not reaching calorie intake recommended by the protocol/unfit to participate due to medical reasons attributed to contracting COVID-19). Twenty-six subjects (13 females and 13 males) with a mean age of 34.53 ± 9.81 years (females 32.23 ± 8.50 , males 36.85 ± 10.48) completed the trial.

2.3 Eligibility Criteria

Adults aged between 30 and 55 years, with a body mass index (BMI) above 30kg/m^2 , in ownership of a smartphone and without any severe health condition that may pose risk for the participant and affect the validity of our findings, were considered eligible. *Table 1* specifies all inclusion and exclusion criteria.

The participants' eligibility was self-reported and was assessed during a preliminary digital pre-screening questionnaire. Individuals who meet inclusion criteria (*Table 1*) were scheduled for a phone call interview with the program dietitian before being selected to participate.

Table 1: Inclusion and Exclusion criteria

Inclusion and Exclusion Criteria
<ul style="list-style-type: none"> ● Inclusion Criteria <ul style="list-style-type: none"> ○ Age: 30-55 years ○ Body mass index (BMI): >30.0 kg/m² ○ Ownership of a smartphone with an internet connection ○ No active severe disease ○ Talent Release Form Consent ○ Located in Sydney Metro area ○ Intent for weight loss ● Exclusion Criteria <ul style="list-style-type: none"> a. Self-Reported Medical Conditions <ul style="list-style-type: none"> i. Diabetes mellitus ii. Severe cardiovascular conditions, liver disease, kidney disease or respiratory disease iii. Clinically significant hypertension iv. Cancers or gastric ulcers v. Severe infections or inflammation vi. Severe mental, behavioural or neurodevelopmental conditions (e.g. eating disorders, severe depressions) vii. Severe food allergies or food intolerances b. Medication <p>Medications with the potential to affect weight, energy expenditure or the participants' judgement ability. All medications were self-reported by the participants.</p> c. Other (self-reported) <ul style="list-style-type: none"> i. Pregnancy or lactation ii. Immobility iii. Smoking or recreational drug use iv. Medically fit to participate

2.4 Study Protocol

In this study, subjects subscribed to the app-based *My Muscle Chef Complete Personalised Weight Loss* program for a duration of 4-weeks.

The *My Muscle Chef Complete Personalised Weight Loss Program* aims to shift eating patterns and nutrition to meet evidence-based practice of regular meal intervals and benefits of high protein and fibre in supporting weight loss. Designed by dietitians, the program takes a personalised approach and allows individuals to select preferences of their meals and snacks, with the ability to tailor the daily calorie intake to suit activity levels and lifestyle.

Participants were required to place their own orders via the My Muscle Chef App. Daily caloric intake was determined by self-reported information including gender, weight, and daily activity level ranging from lightly active, active and very active. Calorie variation between the activity levels was approximately 600-1000 calories per day. Eating patterns were structured around 3 main meals and 3 snacks per day, with no fasting periods at any point.

Participants were instructed to complete a minimum of 30 minutes of moderate to intense physical activity each day. Participants were encouraged to utilise all the app-based features including the menu tracker, daily wellness check in, daily movement tracker and water intake tracker, as well completing a weekly weigh in.

All participants were scheduled to attend a 1:1 dietary education session on a weekly basis with the program dietitian. During each session participants were able to share feedback, receive personalised nutrition counselling and report on weekly weight, chest and hip measurements.

2.5 Quantitative Assessment of Program Effectiveness

Measurement data including weight, chest and hip circumference were self-reported on a weekly basis. To ensure accuracy of data, all participants were advised to take measurements in the morning of each weigh in day, using the same set of scales and measuring tape throughout the study. Participants were also required to submit before and after photographs of their progress to validate their results.

2.6 Qualitative Assessment of Program Effectiveness

A qualitative assessment of participant behaviours, mindset and responsiveness to the weight loss program was conducted simultaneously to the dietary intervention. Subjects were asked to record responses to a series of questions at each week of the program. Participants reported on their change in energy levels, appetite and hunger levels, cravings, weight loss and habit development (See *Table 4 and 5*).

3. Results

3.1 Participants

Participants (n=26) had an average initial BMI of 34.37 (\pm 3.38) and an average age of 34.54 (\pm 9.81) years. The distribution of males to female participants was approximately 43%v vs. 56% respectively.

Table 2: Participants characteristics

	Major Loss (n=9)	Moderate Loss (n=17)	Minor Loss (n=0)
No. of males (%)	38.46	61.53	0 (0)
No. of females (%)	30.77	69.23	0 (0)
Age (SD), years	36.22 (11.66)	33.65 (8.55)	0 (0)
Mean initial BMI (SD)	33.22 (3.83)	35.00 (2.95)	0 (0)

Major loss = \geq 6% weight loss, moderate = \geq 3-5%, minor = 0-2%

3.2 Statistical Analysis

Statistical analysis was carried out on raw data. Descriptive statistics including weight loss, chest and hip circumference in both male, female and the group are presented in Table 3. Categorisation of weight loss as a percentage of total body weight was applied to the data sets to capture upper and lower end results of the group. Weight loss was categorised as follows; major (6%), moderate (>3-5%) and minor (0-2%). Statistical significance was defined as $P < 0.05$.

Table 3: Changes in body weight and body measurements during the 28 day intervention period

	Overall	Major Loss (n=9)	Moderate Loss (n=17)	Minor Loss (n=0)	<i>p value</i>
Mean weight loss males (kg), (SD)	5.81 (1.21)	6.92 (0.42)	5.13 (0.83)	0 (0)	<0.0001
Mean weight loss females (kg), (SD)	5.16 (0.83)	6.13 (0.65)	4.73 (0.45)	0 (0)	<0.0001
Combined weight loss (kg), (SD)	5.48 (1.03)	6.57 (0.66)	4.92 (0.69)	0 (0)	<0.0001
Mean percentage weight change at end of program	5.43%	6.65%	4.76%	0 (0)	-
Mean reduction in chest circumference males (cm), (SD)	6.21 (3.22)	7.36 (3.04)	5.50 (3.12)	0 (0)	<0.0001
Mean reduction in chest circumference females (cm), (SD)	4.68 (3.32)	5.55 (4.37)	4.25 (2.54)	0 (0)	<0.0003
Mean reduction in hip circumference males (cm), (SD)	7.22 (4.19)	4.86 (2.97)	8.69 (4.18)	0 (0)	<0.0001
Mean reduction in hip circumference females (cm), (SD)	5.20 (2.9)	5.50 (4.71)	5.01 (1.51)	0 (0)	<0.0001

Major loss = $\geq 6\%$ weight loss, moderate = $\geq 3-5\%$, minor = 0-2%

3.3 Quantitative Outcomes

Regardless of individual calorie intake, weight loss was observed in all participants. Average weight loss amongst the cohort was 5.48kg ($p < 0.0001$). Participants were categorised as achieving a major weight loss result where a loss of $\geq 6\%$ of total body weight was achieved. Participants in the major group lost a mean weight of 6.57 kg (± 0.66 , $p < 0.0001$) with a range of 5.5-7.5kg. Moderate weight loss was classified as a loss of between 3-5% of total body weight. Subjects categorised as moderate achieved an average weight loss of 4.92kg (± 0.69 , $p < 0.0001$). Minor weight loss was categorised as a result of 0-2% weight loss. No participants fell into this category. Overall amongst males, an average of 5.81kg (± 1.21 , $p < 0.0001$) weight loss was achieved, and amongst females, average weight loss reported was 5.16 (± 0.83 , $p < 0.0001$).

Measurements of chest circumference and hip circumference exhibited similar trends, where higher weight lost correlated in a decrease in circumference measures. All results yield statistical significance across the cohort.

3.4 Qualitative Themes

As a result of the qualitative analysis and interpretation of data a total of six themes were extracted from the responses of participants. *Table 4* shows the frequency of themes as reported by the participants. The qualitative assessment on participant progress throughout the program demonstrated a strong relationship between weight loss and improvement in behaviours as a result of the program.

Table 4: Frequency of themes correlated to weight loss outcomes in intervention group

	Major Loss (n=9)	Moderate Loss (n=17)	Minor Loss (n=0)
Intervention Group			
Weight Loss	9	15	0
Energy Improvement	6	13	0
Appetite Improvement	9	17	0
Habit Development	7	14	0
Craving Control	7	15	0
Ease of program related to success	9	17	0

Major loss = >6% weight loss, moderate = \geq 3-5%, minor = 0-2%. Amongst weight loss categories, responses were measured and recorded if a positive change across the themes was reported by the participants of each of the themes.

3.4.1 Weight Loss

This theme captured the participants' response to their weight loss and change in body shape as a result of the program. The responses in Table 5 emerged from the prompt *“Have noticed a change in your weight loss since you have started the program?”*

3.4.2 Energy levels

This theme captured the participants' response to how they perceived their energy levels throughout and as a result of the program. The responses in Table 5 emerged from the prompt *“Have you noticed a change in your energy levels since you have started the program?”*

3.4.3 Appetite, Hunger Levels and Cravings

This theme captured the participants' responses to how the program helped in managing appetite and hunger levels throughout the day. The responses in Table 5 emerged from the prompt *“How would you describe your hunger and appetite levels so far?”*

3.4.4 Habit Formation

This theme captured the long term health habits formed by the participants over the 4-week weight loss program intervention period. The responses in Table 5 emerged from the prompt *“How has this program improved your eating habits throughout the day?”*

3.4.5 Ease of Program related to Success

This theme captures how participants rated the ease of the program to follow which led to then being successful on the program. The responses in Table 5 emerged from the prompt *“How would you rate the convenience of having all your meals and snacks delivered to you?”*

Table 5: Summary of direct quotes transcribed from participants

Theme	Quote
Weight Loss	<i>“I have always found it really difficult to lose weight with previous weight loss programs, however I was very pleasantly surprised to see that I did lose a lot of weight. I have seen a huge difference in the way that I look and I also feel lighter.”</i>
Energy Improvement	<i>“I would say my energy has increased since starting the program. I found that I’ve got a lot more energy and my energy lasts longer through the day... I have noticed that my energy now lasts throughout the whole day and I no longer feel sluggish in the afternoon.”</i>
Appetite, Hunger Levels and Cravings	<i>“There’s plenty of food so I haven’t been hungry at all. There’s always something to eat in the pack so it keeps me satisfied so I am really happy with it. After every meal I am very satisfied. The meals are quite filling so appetite wise I feel like I am not missing out. I think the meals are fantastic. Having high protein keeps me full.”</i>
Habit Development	<i>“I think I have fundamentally relearned my healthy eating habits, the importance of sticking to a routine of eating timely meals, of course, once which are healthy and nutritious, eating the right meals at the right time of the day is just incredible for your energy levels, performance and mental well-being.</i>
Ease of program related to success	<i>“It’s super convenient because I don’t even have to think about it. Normally, I’d be like, what should I eat? I’ll go to the supermarket, buy a whole bunch of things that I do need to buy, and still not have anything like a meal to make. The great thing about this is that it is portion-controlled. This has taken the guesswork out of everything. So it’s been amazing.”</i>

3.5 Qualitative Outcomes

Participants with previous weight loss experiences reflected on past weight loss struggles describing them as a constant battle, resulting in constantly attempting various weight management methods in order to reach their weight loss goals. A shift in perspective was clear by the conclusion of the program with participants reporting that ease and structure of the program gave them the confidence they needed to be successful and adhere to the program's ideology.

Improvements in energy levels were exhibited as a result of shifting eating patterns to regular meals and consuming more nutrient dense foods such as lean sources of protein, wholegrain and low-GI carbohydrates, as well as fruits and vegetables. This was compared to previous inconsistent intake and occasions of binge eating, resulting in energy fluctuations throughout a typical day.

Additionally, participants indicated that a major change in behaviour was achieved. This involved the breaking of old behaviours, often long-term poor eating and physical activity behaviours which transitioned into the development and relearning of new ones, including an increase in water intake, consistent physical activity, adhering to portion controlled meals and consuming frequent meals in response to a more regulated appetite. Additionally, responses acknowledged that previous impulsive behaviours such as food cravings were substantially reduced in response to the structure and nutritional profile of the program.

4. Discussion

A personalised approach to the provision of dietary advice utilises key characteristics of those whom the intervention is being delivered, thus providing them with a more tailored and sophisticated personalised experience (10). It is known that successful weight loss requires a combination of short term and long term strategies including nutritional and behavioural change interventions to be effective in supporting long term weight management (9,11).

In our control trial (n=26), we evaluated the effect of the *My Muscle Chef Complete Personalised Weight Loss Program* which has been developed based on theoretical evidence that suggests a personalised approach to nutrition not only reduces body weight but also enhances body composition long term (12). It can be concluded that the *Complete Personalised Weight Loss Program* effectively achieves a significant weight loss result over a 4-week period in adult male and females ($p < .0.0001$). We observed an average weight loss of approximately 5.48 ± 1.03 kg (5.43%) in response to the personalised intervention. Overall males achieved a higher mean weight loss than females ($5.81\text{kg} \pm 1.21$ vs. $5.16\text{kg} \pm 1.03$ respectively) correlating to a higher initial starting weight ($105.14\text{kg} \pm 7.82$ vs. $99.14 \text{ kg} \pm 13.67$, respectively).

From a clinical point of view, both quantitative and qualitative results from this study suggest that adhering to a structured program focused on delivering a high protein and calorie controlled nutrition profile, as well as regular physical activity is effective in achieving a significant weight loss result. A recent systematic review and meta-analysis evaluating weight regain after weight loss demonstrated that diet and exercise interventions led to a lower weight at the end of the intervention and improved weight loss maintenance thereafter (13).

Additionally, weight reduction at this level (that is a reduction of baseline weight by at least 5%), is associated with a significant reduction in systolic and diastolic blood pressure, triglycerides and better glucose tolerance contributing to the onset of chronic illness, as well as improved quality of life (13).

In this study we can attribute meal structure, controlled caloric intake and high protein composition as being a key determinant of the observable characteristics of behaviour change and weight loss results. A qualitative analysis demonstrated that following a program structure which accounted for individual lifestyle factors and activity levels, allowed them to adhere to the program with greater ease, thus enabling them to develop new habits that can be maintained long after the program. Studies comparing popular diets have suggested that a major determining factor in weight loss success correlates significantly to adherence over time (14) achievable where nutrition intervention is personalised and adaptive to one's lifestyle. The ability to personalise nutrition in the *My Muscle Chef Complete Personalised Weight Loss Program* enabled participants to understand the value of nutrients which lead to increased confidence in their ability to achieve their weight loss goals due to increased satiety, improved appetite and reduced cravings.

In conclusion, this study has addressed that significant weight loss is achievable on the *My Muscle Chef Complete Personalised Weight Loss Program*. This study has been able to demonstrate thorough scientific evidence that this commercial personalisable program is able to significantly contribute to weight loss whilst enabling individuals to build positive behaviours toward sustainable weight management.

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