

Effects of the ChiroThin Weight Loss Program™ on weight and body size among overweight
adults

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Key terms: Weight loss, obesity, energy metabolism

Abstract

Objective: The ChiroThin Weight Loss Program™ is a 42-day weight loss program that employs the ChiroThin nutritional support formula and the ChiroThin eating program. The purpose of this study was to report on the effects of the ChiroThin Weight Loss Program™ on weight and anthropometric measurements among overweight adults.

Methods: This was an observational study that employed a pre-post intervention design. Chiropractors known to prescribe the ChiroThin Weight Loss Program™ to their patients were surveyed to provide data on weight change one week post program implementation, weight change after program completion (change at 6 weeks), and changes in anthropometric measurements after program completion. Multilevel regression models were used to assess significant weight loss and body size reduction.

Results: At one-week, average weight loss was 8.82 pounds. At six-weeks, average weight loss was 24.67. Differential effects of patient sex were found, with males losing more weight than females at one week (Females: $M = 7.99$, $SD = 3.10$; Males: $M = 11.05$, $SD = 4.00$) and six weeks (Females: $M = 22.40$, $SD = 5.36$; Males: $M = 30.00$, $SD = 8.86$). Further, the mean reduction in body size (sum of all anthropometric measurements) was 20.20.

Conclusion: The results indicate that the ChiroThin Weight Loss Program™ was an effective treatment for the observed patients, with a strong association between intervention, weight loss, and body size reduction. Positive results were observed within one week of initiating the program, which were sustained throughout the full six weeks. Implications for individuals struggling with excess weight are discussed.

Introduction

The proportion of adults in the United States defined as overweight or obese, operationalized by having a body mass index (BMI) greater than 24 and 29 respectively, has risen from around 50% in the early 1980's to over 70% today.¹ A likely reason for this increase is the continued societal progression towards increases in portion size, excess energy intake (via energy-dense foods), and simultaneous decreases in physical activity.²⁻³ As a result, obesity and obesity-related medical problems, such as heart disease, stroke, and type 2 diabetes pose threats across the United States, as well as other countries struggling with obesity.⁴ Thus, the majority of adult Americans could benefit from effective anti-obesity treatments.

Accumulating evidence indicates that calorie-restricting diets that are implemented by addressing portion size and food nutritional quality can serve as an effective treatment for obesity.²⁻³ For example, studies have shown that these types of diets may allow individuals to more effectively lose weight, maintain a healthy weight, and prevent chronic diseases associated with obesity.⁵⁻⁸ However, adherence remains a critical factor that will determine the effectiveness of any anti-obesity treatment.^{3,9} Thus, patient education is a key element to incorporate into an anti-obesity treatment strategy.¹⁰⁻¹² One promising option that aims to treat obesity by implementing each of these aspects (low-calorie, portion size, dietary energy density, and patient education) into an overall treatment program is the ChiroThin Weight Loss Program™.

The ChiroThin Weight Loss Program™ firstly consists of an eating program that utilizes specific amounts, blends, and ratios of protein and complex carbohydrate food sources along with the implementation of daily intermittent fasting, which has received support for its weight loss benefits, especially in combination with calorie-restricting diets.¹³⁻¹⁵ In this way, the program aims to incorporate a strategy that combines calorie restriction with portion size control and an

improvement in diet quality as it relates to energy density.^{2,5} Additionally, the ChiroThin eating program teaches participants how to make food choices that aid in the promotion of long-term weight reduction by educating participants on behavioral habits related to food purchases, meal preparation, and food consumption. Additionally, participants are shown how to shop for, prepare, and consume foods that promote long-term weight loss and improved health.

A crucial aspect of the ChiroThin Weight Loss Program™ is a simultaneous implementation of a nutritional support formula. The ChiroThin Nutritional Support formula is a proprietary formula that is composed of various amino acids, cell salts, and vitamins at multiple homeopathic potencies. Each ingredient has been included for its stand-alone effects at each individual potency as well as its interactions when combined with the other ingredients at their individual potencies. These ingredients include L-arginine, L-orthinine, L-carnitine, L-tyrosine, L-leucine, L-lysine, L-typtophan, and vitamin B12. Further, the nutritional support formula uses only all-natural ingredients and is both stimulant-free and hormone-free. These ingredients have been well studied for their relationships with a multitude of health benefits. These various amino acids and vitamins help promote detoxification, aid and stimulate metabolic functioning, stabilize blood sugars, and help control mood and appetite.¹⁶⁻¹⁹ Ingredients have also been shown to help maintain energy levels, reduce fatigue, and are related to increases in aerobic capacity.²⁰⁻²⁵ The ingredients contained within the nutritional support formula aid in hormone production and regulation, thereby allowing for interactions with the Hypothalamic-Pituitary-Adrenal-Thyroid Axis to aid in the prevention of HPAT axis dysregulation.²⁶ HPAT axis dysregulation has been proposed to play an important role between conditions such as maternal malnutrition, sleep deprivation, metabolic disease, and metabolic syndrome.²⁰⁻²¹ As such, preventing dysregulation of the HPAT axis may help prevent obesity, especially upper body obesity and other metabolic

diseases.²⁶ While a systematic review is outside the scope of the present study, a comprehensive list of the primary literature relating to individual ingredients can be found in the supplementary materials.

The aim of this study was to assess the effects of one cycle (equal to 42 days) of the ChiroThin Weight Loss Program™ on weight loss and body size reduction. Study outcomes included weight change one week after initiating the ChiroThin Weight Loss Program™, weight change at the end of the cycle (42 days after beginning the cycle) and change in body size at the end of the cycle. Predictions for the current study include significant weight loss overall at both one and six weeks post program implementation, with weight loss being greater for males than females. Body size reduction was also hypothesized to be significantly greater than zero after program completion.

Method

Study Design and Sample

This was an observational study that utilized a pre-post intervention without a control group or blinding. Inclusion criteria for this study were as follows: Participants were at least 18 years of age or older, have a BMI greater than 24, not be pregnant or breastfeeding, not have cancer or be receiving treatment for cancer, and to not have had active cholecystitis within the last 4 weeks. The ChiroThin Weight Loss Program™, which served as the intervention, is offered and administered exclusively through chiropractic offices. All chiropractic offices that offer the ChiroThin Weight Loss Program™ were emailed asking for their participation. Each office was asked to have their medical/chiropractic assistant(s) randomly select up to 25 male and female patients that had completed a 42-day cycle of the program. The following information was requested for each patient; sex, age, ethnicity, weight change at one week, weight change at six

weeks, and change in body size at six weeks. Body size was assessed by taking measurements from the neck, shoulders, chest, abdomen, hips, right bicep, right thigh, and right calf. As this study utilized extant data that were completely anonymous, ethics committee approval was not required.

Intervention

The intervention consisted of a 42-day cycle that incorporated an intermittent/micro-fasting component, meal guidelines to follow, a nutritional support formula, and weekly visits to discuss the program. The micro-fasting component was implemented via the removal of the morning meal. Thus, participants only consumed an afternoon meal and evening meal during the 42-day cycle. Meals were to meet the following guidelines: 1) both proteins and carbohydrates were required at each meal (a list of acceptable proteins and complex carbohydrates, as well as the quantity of each, is provided), 2) specific “free” vegetables (a list is provided) could be consumed in near unlimited quantity at any meal, 3) ingredients that contain fat or sugar were to be avoided while zero-calorie seasonings and sauces are acceptable, and 4) 80-120 ounces of water were suggested to be consumed per day. A recipe book was provided containing approved meals that participants could choose from during the program or an option to develop meals on their own that aligned with the guidelines. Participants were also provided with a “Food Tracking Journal” to document their meals.

The ChiroThin nutritional support formula is a sublingually delivered nutritional supplement that is consumed 3 times per day for 39 consecutive days (days 1-39 of the program). Participants do not consume the nutritional supplement on days 40, 41, and 42. The recommended spacing for consumption of the nutritional support formula is 7 hours apart and the recommended times for consumption are 7 am, 2 pm, and 9 pm. Being as the nutritional support

formula is delivered sublingually, participants are instructed to abstain from consuming liquids or foods 5-10 minutes before and 5-10 minutes after the formula's administration. The six weekly follow-up visits that occur over the course of the program each include: 1) a review of the "Food Tracking Journal" with discussion related to the choices the participant made during the previous week, 2) a counselling session related to food choices, food-related behavior, what went well, what did not go well, and what can be done to improve, 3) a BMI calculation, 4) an 8-point body measurement update, 5) a blood pressure reading, and 6) a weight measurement.

Once the participant has completed the 42-day cycle, they enter a re-feeding/weight maintenance phase where they are transitioned to a more traditional food consumption schedule consisting of 3 meals per day. The participant is provided with easy-to-implement guidelines delineating the types and quantities of foods that they should continue to consume to maximize the likelihood of maintaining their weight loss. Participants are also encouraged to implement a physical activity/exercise program of their choice during this phase.

Statistical Analysis

The current analysis utilized a multilevel modeling (MLM) approach. This approach is used when data are hierarchical in nature, or has a nested structure. The data analyzed here included randomly sampled patients within randomly sampled chiropractic offices throughout the United States, exemplifying a nested structure. MLM is also advantageous in terms of controlling correlated error, and having greater sensitivity and statistical power to detect potential effects.²⁷⁻²⁸ Data screening and statistical assumption checking were also performed to assure the use of MLM was appropriate.

The model implemented here examined weight change at two time points (One week and six weeks post intervention), as well as body size reduction at one time point (Six weeks post

intervention). Several variables (covariates) were explicitly modelled and controlled for, including the effects of age, ethnicity, and geographical location on weight loss. Effects of patient sex on weight loss and body size reduction were then added after controlling for the covariates mentioned previously. Analyses were conducted with the *nlme* package in *R*, and effect sizes for mixed models used the *MuMIn* package.²⁹ All data, experimental materials, supplementary materials, and code are publically available at <https://osf.io/y4c52/>.

Results

The original sample obtained included 353 females and 224 males. However, after screening patients for excessive missing data (> 5%), accuracy, outlying observations, and restricting the current sample to observations within the United States, the final sample yielded 274 females (Age: $M = 50.00$, $SD = 13.70$) and 173 males (Age: $M = 50.80$, $SD = 12.18$). Data were first screened for accuracy and normal assumptions. Six multivariate outliers (using Mahalanobis distance scores) were found and excluded from further analysis. Linearity, homogeneity, homoscedasticity, and multivariate normality assumptions were all examined and met for the retained sample.

For the effects of ChiroThin on weight loss, Table 1 shows statistical values for all model comparisons. Here and throughout the manuscript, Bayesian Information Criterion (BIC) values are used, with lower BIC values being indicative of better model fit. First, a random intercept model ($BIC = 6654.59$, $R^2 = .03$) was compared to an intercept only model ($BIC = 6656.25$), which was significantly better ($p < .001$), suggesting nesting by office location was appropriate. To assess if weight loss changed as a function of age or ethnicity, these covariates were then entered into the model, which did not significantly improve model fit, $BIC = 6684.19$, $p = .50$. This result implied comparable weight loss across all ages and ethnicity. Thus, overall effects of

weight loss were interpreted from the random intercept only model (akin to a one-sample t -test). Average weight loss after one week was 8.82 lbs. ($SE = 0.48$), which was significantly greater than zero, $t(434) = 18.38$, $p < .001$, Cohen's $d = 2.47$. Average weight loss after six weeks was 24.67 lbs. ($SE = 0.89$), which similarly differed from zero, $t(434) = 27.86$, $p < .001$, Cohen's $d = 3.39$.

Table 1. model Comparisons for MLM Analyses for Weight Loss

<i>Model</i>	<i>df</i>	<i>BIC</i>	<i>LogLik</i>	<i>Test</i>	<i>L. Ratio</i>	<i>p-value</i>	<i>R²</i>
Intercept Only	2	6656.25	-3321.33				
Random Intercept	3	6654.59	-3317.10	1 vs 2	8.46	.004	.03
Covariate	8	6684.19	-3314.91	2 vs 3	4.38	.50	0.03
Sex	9	6633.75	-3286.29	3 vs 4	57.24	<.001	0.08
Time	10	5506.91	-2719.48	4 vs 5	1133.64	<.001	.75
Interaction	11	5477.27	-2701.26	5 vs 6	36.43	<.001	0.76

Note. This table shows the model comparisons for the MLM analyses for weight loss. Models included the intercept only model, random intercept model, and then adding the covariates of age and ethnicity. The variables of sex and time were subsequently entered in a step-wise fashion.

Next, to examine differences between time points, and potential effects of patient sex on weight loss, these variables were added to the model in a hierarchical fashion. Both effects of sex ($BIC = 6633.75$, $p < .001$, $R^2 = .08$) and time ($BIC = 5506.91$, $p < .001$, $R^2 = .75$) improved model fit. An interaction term between sex also significantly improved the model ($BIC = 5477.27$, $p < .001$, $R^2 = .76$). Table 2 shows regression values for all predictors during the step they were entered.

Table 2. Regression values for Moderation Analyses of Weight Loss

	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Intercept	16.88	0.58	29.23	< .001
Sex	5.17	0.63	7.67	< .001
Time	16.06	0.34	47.85	< .001
Week 1: Males vs. Females	2.97	0.31	9.51	< .001
Week 6: Males vs. Females	7.29	0.61	12	< .001

Note. This table shows regression values for all predictors from the MLM analysis in the step they were entered into the model. The last two rows refer to the interaction between sex and time, with differential weight loss between patient sex, which was greater at six weeks compared to one week.

To further examine the interaction between patient sex and time, separate multilevel models were run, split by patient sex. Model specifications were the same as previous models. After one week, males ($M = 11.05$, $SD = 4.00$) lost significantly more weight than females ($M = 7.99$, $SD = 3.10$, $p < .001$). This difference was further augmented after six weeks, with males ($M = 30.00$, $SD = 8.86$) losing even more weight than females ($M = 22.40$, $SD = 5.36$, $p < .001$). To aid in visual interpretation, Figure 1 depicts weight loss across the two time points for both males and females.

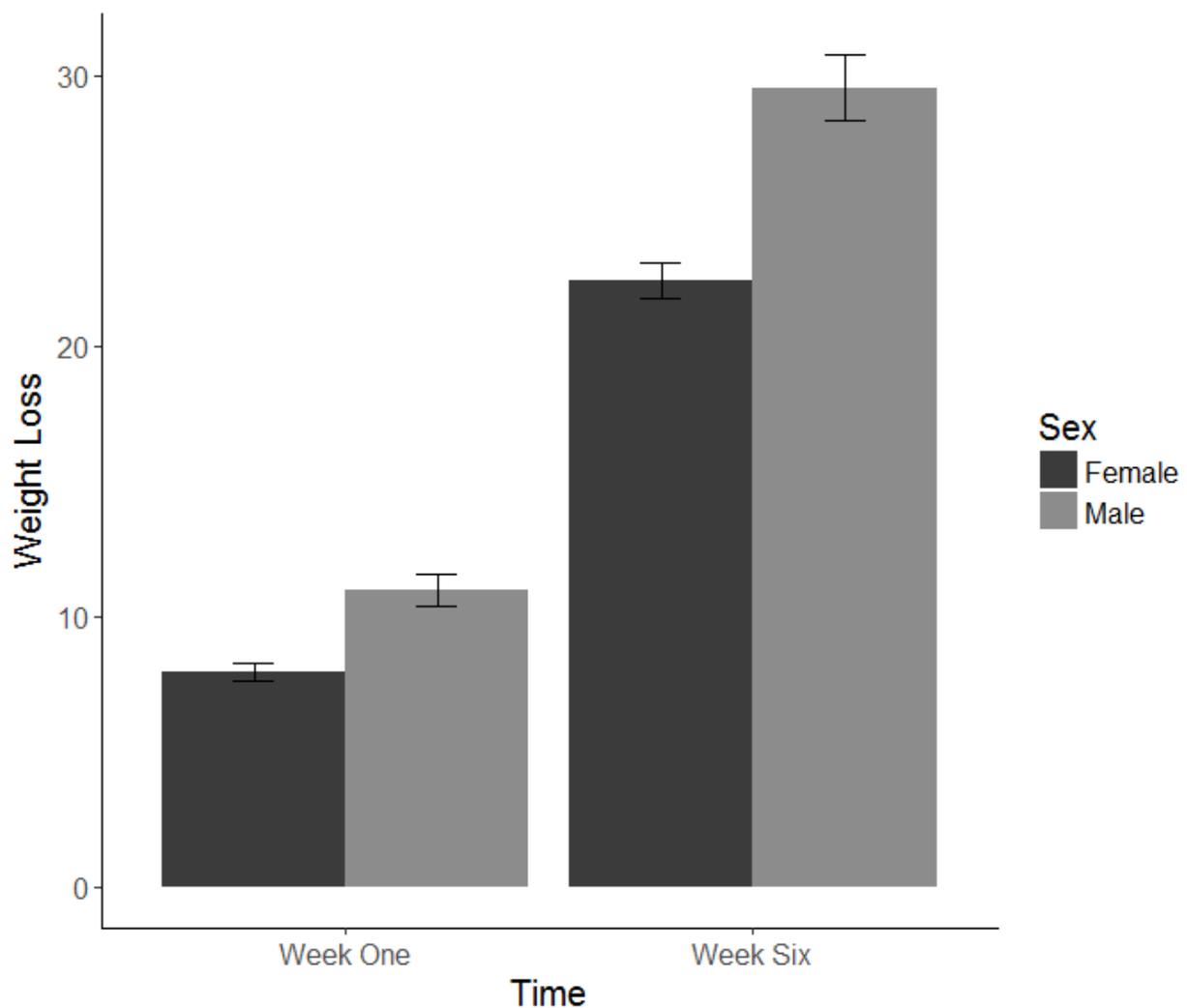


Figure 1. This graph shows weight loss across time, split by patient sex. Higher values indicate more weight loss. Weight loss was greater after six weeks, as well as an interaction between time and sex, with weight loss being greater between males and females across time.

Considering body size measurement reductions, the same approach as before was used. Static ($BIC = 2990.48$) and random ($BIC = 2764.20$) intercept only models were fitted, with random intercept only models showing significantly better fit, $p < .001$. Covariates of age and ethnicity were then entered, followed by patient sex. Neither significantly improved model fit ($BIC = 2789.20$, $p = .26$ and $BIC = 2793.57$, $p = .19$ respectively), showing comparable levels in

body size reduction across these variables. Thus, body size reduction overall was interpreted from the random intercept only model. Average body size reduction after six weeks was 20.20 ($SE = 1.38$), which was significantly greater than zero, $t(434) = 14.60$, $p < .001$, Cohen's $d = 2.90$.

Figure 2 shows the spread and frequencies of body size reduction across a range of body size reduction values. Full model comparisons and regression values for body size reduction can be found in the supplementary materials.

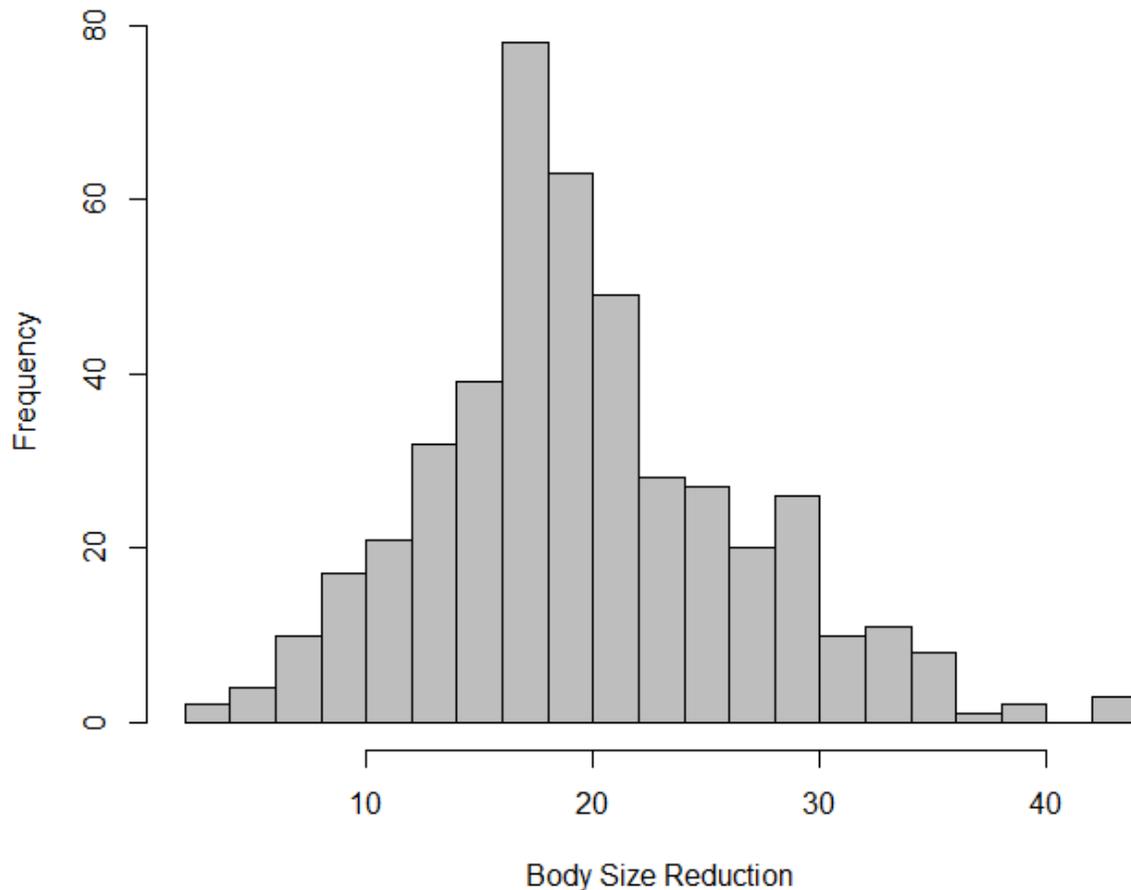


Figure 2. This histogram shows a range of body size reduction values along the x-axis, along with frequency estimates along the y-axis.

Discussion

This study aimed to assess the effects of one cycle (equal to 42 days) of the ChiroThin Weight Loss Program™ on changes in body weight and body size. Results indicated that this program was an effective treatment for individuals struggling with excess weight. Positive results of the ChiroThin Weight Loss Program™ were observed within one week of initiating the program (average weight loss of 8.82 pounds) and benefits improved throughout the full 6 week program (average weight loss of 24.67 pounds). These benefits are likely to decrease the risk of metabolic syndrome and certain diseases, including, but not limited to, cardiovascular disease, stroke, and type II diabetes.³⁰

Recommendations suggest that overweight and obese patients should set a goal of a 10% reduction in total body weight and be encouraged to lose approximately 2% of initial body weight per week to reach the 10% goal.³¹⁻³⁵ Thus, for an individual with a starting weight of 200 - 250 pounds (the typical average weight across men and women that use the ChiroThin Weight Loss Program™), the ChiroThin program appears to fit perfectly with these recommendations. For example, a 2% weekly reduction in an individual with a starting weight of 225 pounds translates into 4.5 pounds per week. Further, a 10% initial weight loss goal translates into 22.5 pounds (participants lost an average of 24.67 pounds overall in this study).

Results from other commercial programs can be informally compared with the findings of this study. A study investigating the Weight Watchers program reported a mean weight loss of 5.1% of initial body weight at 26 weeks.³⁶ In a separate study that investigated the eDiets.com program, the eDiet intervention lost 0.9% of initial body weight at 16 weeks.³⁷ A study that investigated the Jenny Craig program reported a mean weight loss of 7.8% of initial body weight at 26 weeks.³⁸ Lastly, a study that investigated the Beachbody weight loss program reported a

weight loss of 8.7 pounds over a 21-day period.⁵ While study samples and endpoints employed in these studies differ from the current study, the ChiroThin program investigated here appears to outperform other commercial weight loss programs. Direct comparisons between weight loss programs with greater experimental control presents an exciting venue of future research.

Limitations and Future Research

This study had several limitations. First, the lack of blinding, randomization, and a control group limits the generalizability of the results. Thus, these findings should be interpreted as correlational, not causal. Second, even though chiropractors were encouraged to randomly select which eligible patients to provide data for, potential participant selection bias by the chiropractors that provided the data could further limit the generalizability of the results. Third, the lack of baseline weight and body size measurements (only weight change was provided) precluded an investigation into the effectiveness of the program as a function of initial weight (or percentage of weight lost). However, our results do show that the program effects were large across all genders, age, and ethnicity examined. Lastly, this study only investigated the effects on patients that successfully completed a 42-day cycle. Thus, the overall effectiveness among all eligible patients that initially enrolled in the program is likely lower. However, participants generally tolerate the program well and as result program adherence is likely high.

The present findings also provide insight into future directions. Current investigations, and future research can address the causality of these findings by implementing proper experimental methodology, such as the use of participant and researcher blinding and appropriate control groups. Interesting comparisons could also include manipulations of cycle length and compound effects of completing multiple cycles. Recidivism rates are an important factor for all dietary supplements, and thus is an important unanswered research question. Lastly, future

studies could address the differential effects of the eating program versus the nutritional support formula in weight loss and body size reduction.

Conclusion

The effects of the ChiroThin Weight Loss Program™ on weight loss and body size reduction were assessed through this exploratory study from patients at multiple sites across the United States. Average weight loss at both one and six weeks was significantly greater than zero, with males losing more weight than females. Body size reduction was also found to be significantly greater than zero. These findings suggest that the ChiroThin Weight Loss Program™ can serve as a promising tool in the facilitation of weight loss and body size reduction.

Funding sources and potential conflicts of interest

The author is the founder and CEO of ChiroNutraceutical and developed the ChiroThin Weight Loss Program™.

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