pISSN 2320-6071 | eISSN 2320-6012

Original Research Article

DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20221173

Weight loss methods and diet history among bariatric surgery candidates

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Received: 25 March 2022 Revised: 13 April 2022 Accepted: 14 April 2022

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ABSTRACT

Background: Nowadays there are multiple conservative treatments, medical and alternative for weight loss, with high failure levels in patients with obesity. The history of variability, effectiveness, and diversity of such treatments has been poorly explored in candidates to bariatric surgery, particularly in Latin America, where high rates of overweight and obesity are found.

Methods: Cross-sectional study in a single center, where a questionnaire was given to all patients who presented for bariatric surgery evaluation. The primary objective was to identify the dietary history and methods used for weight loss in patients with obesity, focusing in the diet type/method, length, effectiveness, and weight regain. Also, a basal anthropometric/demographic analysis, and type of method used (diet, medications, homeopathy, supplements, and alternative therapies) was performed.

Results: 400 questionnaires were evaluated, from which the average age was 40.2 years, 79.5% representing female sex, and an average weight of 114.8 kg. Childhood obesity was reported in 38%. 64.5% used among 1-5 methods to lose weight historically, but 74.7% never associated physical activity. Supervised diet (with and without medication) was the most effective method (44% of cases used medication); however, they were discontinued in 50.5% due to adverse effects.

Conclusions: The use of a diet or alternative treatments, with or without medications, have shown poor weight loss and minimum durability. The use of medication is very common, but most people discontinue their use due to adverse effects events.

Keywords: Obesity, Diet, Bariatric surgery, Weight loss methods

INTRODUCTION

Obesity and overweight represent an epidemiological problem, increasing worldwide with alarming numbers. ¹ It is directly related to main chronic-diseases, that increase patients' morbidity-mortality even more as well as of degenerative diseases, such as cardiovascular, metabolic, and pulmonary country or the region, the culture, type of nutrition, socioeconomic and educational health system costs. ^{2,3} The focus on obesity management is based on

prevention and timely treatment to avoid major complications, therefore, there are diverse alternatives, such as lifestyle, nutrition, physical activity, pharmacotherapy, alternative therapies, endoscopic therapies, bariatric surgery among others. The use or preferences for such approaches is not only based on scientific knowledge and medical adjustment. There are deep determinants, such as the due to their ease for initial attachment, low costs, and accessibility. Within 46 level, religion, and personal beliefs. The leads to multiple

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possibilities for dietary management, sometimes even without scientific support.⁴

For patients with obesity, diet therapy or the use of nonsurgical methods, usually have high rates of failure in medium-and long-term, but they are still the most used quantitative recommendations for calorie restrictions.^{5,6} Pharmacological management is focused on appetite decrease, modifying metabolism or inhibiting caloric absorption.^{7,8} However, there are serious complications related to safety and adverse events.9-11 Regarding alternative methods and homeopathy, they are generally popular, due to the little effort involved, but most of times, there is a management, dietary intervention involves qualitative food modifications, and lack of scientific and safety support. 12-15 Among all weight loss therapies, bariatric surgery continues to be the most effective. 16 Almost all candidates to such procedures reported a long history of failed attempts for diets, and multiple therapies, but there is a lack of detailed information on the subject. In this study, the dietary history and habits were analyzed through a questionnaire for patients who assisted for the first time to a bariatric surgery evaluation.

METHODS

This was a cross-sectional study performed in the obesity clinic at Hospital General Tlahuac Mexico City, Mexico. Where a questionnaire was given to all patients who presented for bariatric surgery evaluation in a 6-month period from July 2019 to December 2019. The questionnaire consisted of 10 questions, the primary purpose was to analyze the number and type of diets/methods used, obesity history, effectiveness, weight regain, physical activity as well as the use of medication and alternative methods (Annexure 1). Also, a basal anthropometric and demographic analysis was included. During the last 6 months total of 438 patients visited the obesity clinic at Hospital General Tlahuac, patients with bariatric surgery background (25 patients), those not willing to participate in the study (2 patients), incomplete questionnaires (2 patients), and those with a body mass index (BMI) less than 35 kg/m² (9 patients) were excluded. A sample size of 400 patients was used for our study. The questionnaire was delivered, monitored and collected by a bariatric surgeon and it was performed at the first medical interview.

For the analysis of all methods that each patient has used at least once in life (regardless whether there was a diet association or not), the methods were divided into 5 categories: only diet, use of medication, alternative methods, nutrition supplement and homeopathy. Within the only diet group, the questions were focused to most popular types and practices, and that are based on the food mentioned by patients (non-monitored diet, diet with raw food, ketogenic diet, diet based on fruits or vegetables and diets with intermittent fasting). Within the medications' use group, metformin, phentermine, orlistat, sibutramine, diuretics, hydrochloride/atropine sulfate/aloin with or

without triiodothyronine, and diazepam) and unknown tablets (when the patient does not know the type of treatment or mentioned by patients (non-monitored diet, diet with raw food, ketogenic diet, diet based on fruits or vegetables and diets with intermittent fasting). Within the medications' use group, metformin, phentermine, orlistat, sibutramine, diuretics, thyroid hormones, Redotex® (Dnorpseudoephedrine hydrochloride/atropine sulfate/aloin with or without triiodothyronine, and diazepam) and unknown tablets (when the patient does not know the type of treatment or they are non-labeled tablets). Within alternative methods group, acupuncture and biomagnetism were included. Data were expressed as mean±standard deviation (SD) values and percentages, as needed. Significance was reached when p<0.05. Analysis was performed using NCSS 2007 (Kaysville, Utah, USA).

RESULTS

In a period of 6 months, 400 surveys were obtained. Female sex represented 79.5%, with a mean age of 40 years. Basal weight and BMI were 114.8±24.1 kg reported in 38%, adulthood in 33% and adolescence in 29%. The mean duration of any diet was 6.6±5.4 months, with weight loss maintained up to 7.8 months; a mean weight regains of 16.4±12.2 kg was reported (Table 1).

Table 1: Baseline demographics, anthropometrics and diet history.

Characteristic	n=400
Age (years); mean±SD	40.2±9.9
Female sex; n (%)	318 (79.5)
Weight (kg); mean±SD	114.8±24.1
BMI (kg/m²); mean±SD	44.4±8.5
Obesity since childhood; n (%)	152 (38)
Best diet duration (months); mean±SD	6.6±5.4
Weight loss duration (months); mean±SD	7.8±7.9
Weight regains after best diet (kg); mean±SD	16.4±12.2
Associated physical activity; n (%)	101 (25.3)

*SD: standard deviation, BMI: body mass index, kg: kilograms.

Historically, 64.5% of patients have between 1 to 5 diets/methods to lose weight, followed by 6 to 10 (22.5%), and more than 11 (11.5%); only 1.5% reported no method at all. Regarding the method that caused the best weight loss, the diet associated to medications (44.2%) was the most effective, obtaining in 31% of cases a loss of 5-10 kg in a period of 6.9 months. This loss was maintained for 8.4 months, and there was a mean weight regain of 17.6 kg. Regarding the time of use, the method based on juices and smoothies/shakes/supplements had the longest (7.2 months). Regarding weight regain, alternative methods were those which showed the greater incidence, with a mean of 18.5 kg (Table 2). Only 24.3% of the survey respondents reported having performed physical activity associated to a diet.

Table 2. Analysis according to patient's historical best weight loss method.

Parameters	n=400	Average duration (months)	Average weight loss durability (months)	Weight regain (kg)	Weight loss of >20 kg; n (%)
Diet alone	144 (36)	6.4	7.2	14.7	30 (7.5)
Diet plus drugs	177 (44.2)	6.9	8.4	17.6	29 (7.3)
Juices/shakes/supplements	25 (6.5)	7.2	7.8	13.8	2 (0.5)
Alternative therapies	54 (13.5)	5.7	6.6	18.5	1 (0.3)

^{*}Kg: kilograms.

An individual analysis was performed within the 5 categories ever used by the 400 survey respondents (number of events), obtaining 1,268 methods/diets/medications (an average of 3.1 different methods per person). A total of 287 respondents (71.7%) used at least 1 medication at some time. From them, there was an accumulation of 612 drugs (2.1 drugs per person on average), being the most used amphetamines and orlistat. The majority (n=119; 41.4%) have used only one drug historically. From 1-3 drugs 219 patients (76.3%), and 4 or more 23.6%; 50.3% of patients reported having discontinued their use due to side effects (Table 3).

Table 3: Medications used at least once by every patient.

Medication	n=287 patients Events 612 (100%) N (%)
Amphetamines	135 (22)
Orlistat	124 (20)
Unknown pills	108 (18)
Redotex	86 (14)
Sibutramine	64 (10.5)
Diuretics	40 (6.5)
Thyroid hormones	34 (5.5)
Phentermine	21 (3.5)

Number of events (n=612) in 287 patients

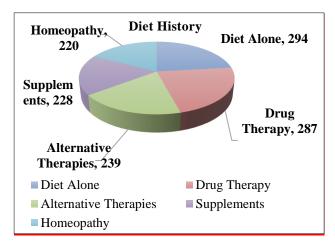


Figure 1: Overall number of methods used at least once in a lifetime by patients seeking bariatric surgery.

Diet without medication was the method with the greater incidence of use (70.7% of survey respondents), prevailing diets non-monitored by a professional (53.3%), followed by ketogenic diet (22.3%) and diet based on juices (15.5%). The next method most used was alternative methods (59.7%) with acupuncture (56.2%) and magnets (20%). The use of supplements was reported in 25%, prevailing Herbalife® (37.7%), and supplements with carnitine (19.8%). Homeopathy as an independent method was reported in 27.5% of cases (Figure 1).

DISCUSSION

In this cohort study of candidates to bariatric surgery, there was a high incidence in the use of multiple methods for weight loss, including diet, medication, supplements, homeopathy or alternative therapies. All methods demonstrated little efficacy and durability, including the use of drugs that was discontinued due to supplements, homeopathy, or alternative therapies. All methods demonstrated little adverse effects in more than half of the cases. Physical activity is associated in less than a quarter of patients.

Weight loss in patients with overweight and obesity has a direct impact on mortality, chronic diseases, cardiovascular risk, cancer, among others. Initial and more conservative treatment for weight reduction requires changes in lifestyle, including diet, physical activity and behavior modification. The guidelines by the American college of cardiology (ACC), the American heart association (AHA) and the obesity society (TOS) report a significant improvement in health when 2-5% of corporal weight is lost, also the current data suggests that a reduction of 10% in corporal weight is associated to a decrease in cardiovascular risk. 17,18

There are different studies that show the benefits in changes in lifestyle and diet to decrease morbidity-mortality in obese patients with diabetes, such as the study of the program for the prevention of diabetes. ¹⁹ Also, the look action for health in diabetes (AHEAD) trial, where a comprehensive intervention of lifestyle with education and diabetes support is compared, a significant improvement in HbA1c and improvement lipid control, sleep apnea and blood pressure were observed.²⁰

There are multiple diets, with variable results in weight loss, those that have demonstrated improvements in weight loss may be classified in those balanced and those with low fat, low carbohydrates and Mediterranean diet; being the best predictor for weight loss the compliance thereof, regardless of the type, as well as surveillance by a specialist, maintaining a loss mainly in the first year.²¹

In our study, almost the fourth part mentioned that the diet that provided the best results was the one prescribed by a healthcare professional, it is also described as one of the methods that maintained a weight loss for a longer time. All of them demonstrated a variable weight loss, as well as an improvement in comorbidities when they are supervised by a professional. On the other hand, diets based on juices with an adequate balance may provide the amount of nutrients required; in our study it was the best tolerated method with a length around 7 months.^{22,23} It is important to note that feeding regimes without supervision report the lowest levels in weight loss, as we found in our study, these regimes are related to greater rates of weight regain, mainly when it is about hypocaloric diets (lowenergy and very-low-energy diets). These diets are defined by the energetic content of 400-800 kcal, which may achieve moderate weight loss, but metabolic disturbances and adverse events are frequent.24

The diet that maintained the most sustained weight loss was the one associated to medication. Almost half of our patients reported this as the most successful method for weight loss, therefore, its use is increasing and is getting more common for the general population. However, not all drugs have Food and Drug Administration (FDA) approval, as for the case of amphetamines, and many of them have been recalled from the market due to the amount of side effects, as for the case of fenfluramine, medicine that as many adrenergic stimulators increases the arrhythmogenic and hypertensive risk. A third part of our patients used amphetamines as a treatment for weight loss, being the most used pharmacological treatment, followed by Orlistat and in third place the use of non-specific tablets. It is important to note that almost 10% of our patients reported having used thyroid hormones and diuretics; popular methods used for weight loss during the 40's and 50's. Hormones can cause serious cardiac problems and muscular weakness due to the increased nitrogen excretion.²⁵

One of the drugs recommended as clinical treatment for obesity, widely used in our study is Orlistat; a drug that can induce around 3% of weight reduction. One of the disadvantages of this drug is the deficiency of fat-soluble vitamins related to its mechanism of action; therefore, it is advised to all users to receive oral supplementation during the treatment period. Among its side effects, gastrointestinal effects prevail, that many authors consider that 80% of users will have at least one side effect at any time, and 15-30% will have frequent side effects. Information important to note, since half of our patients reported having discontinued the use of drugs due to the

discomfort they caused. Sibutramine also has an increase rate of side effects, like acute myocardial infarction, according to the SCOUT study.²⁶ The decision to initiate the use of drugs for weight loss must be individualized, evaluating the risks and benefits; the individual use of drugs is preferred over combinations.²⁷ Newer drugs, like glucagon-like peptide-1 receptor agonists (liraglutide and dulaglutide), and dipeptidyl peptidase - 4 inhibitors (sitagliptin and linagliptin) have shown promising results, but longer studies are needed.²⁸

Nutrition supplements correspond to one of the most accepted methods by the general population, being its use reported up to 33.9% of the population seeking a weight loss, and most used by female sex, mostly the use of herbal extracts, which exert their effect through their phytochemical constituents.^{29,30}

In our study, the great majority used them, with special attention to the use of Herbalife®, which in several studies has shown a high incidence of adverse effects. ^{31,32} Elinav et al reported hepatotoxicity after its use for 11.9±11.1 months. Resulting in 2 cases of sub-fulminant liver failure, and 1 fulminant case, likewise 1 case required liver transplantation. Although they are widely used by the population, their use is not recommended since the evidence supporting their efficacy and safety is limited.

Currently, alternative methods are increasingly used. Acupuncture requires special attention, being the method mostly used in our study. Several advantages have been proposed for the obese patient.^{33,34} Most of the studies conducted are non-controlled, small, short-term studies and do not include adequate placebo controls. In our study, the alternative methods were the least successful and those that had a higher rate of weight regain.

In summary, almost every patient seeking bariatric surgery have a long and diverse dietary history. Diet and medications are frequently used, with high discontinuation rates due to side effects. There are several weight loss methods without strong scientific background on arise.

The study design constitutes a major limitation of the study. The study was retrospective, single center and only low-income Mexican patients were included, reducing the pharmacological treatments to "classic" (older) drugs.

CONCLUSION

The use of a diet or alternative treatments, with or without medications, have shown insufficient weight loss and poor durability. The diet associated to medications was the most effective method, but the most prevalent diet was without medication. The method that had the longest duration of use was juices/smoothies/shakes/supplements. The use of medication is very common, but most people discontinue their use due to adverse events. Very few people add physical activity while on a diet.

ACKNOWLEDGEMENTS

Authors would like to acknowledge the Obesity Clinic at Hospital General Tláhuac.

Funding: No funding sources Conflict of interest: None declared

Ethical approval: The study was approved by the

Institutional Ethics Committee

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Cite this article as: Vertiz LG, Sahagún CMV, Guerrero EMS, Licona CGC, Escobedo SUP, Zerrweck C. Weight loss methods and diet history among bariatric surgery candidates. Int J Res Med Sci 2022;10:1028-34.

ANNEXURE

Survey applied during the first consultation

AG	EGENDERWEIGHT HEIGHT					
Plea	ase do not leave empty questions					
1	When did you start with your obesity problem?					
	Childhood / Adolescence / Adult					
2	Approximately, how many diets have you done since your youth?					
	a) Never b) 1-5 c) 5-10 d) More than 10					
3	What type of method induced the most weight loss? (Only indicate one option)					
	a) Diet without professional supervision (without medication) b) diet established by registered nutritionist or					
	doctor (without medication) c) medication and diet d) diet based on juices, smoothies, shakes, supplements e)					
	acupuncture, magnets, homeopathy					
4	How many kilograms have you lost with the most effective method?					
	a) 0 to 5 kg b) 5 to 10 kg c) 10 to 15 kg d) 15 to 20 kg e) More than 20 kg					
5	Duration (months) of the most effective method					
6	How many months did you maintain weight loss, induced by the most effective method?					
7	How many kilograms did you regain after the most effective method?					
8	During your best diet, did you perform any physical activity (supervised or not)?					
	a) Yes b) No					
9	Cross out which of the following diets have you ever followed? (multiple answers are allowed)					
	Diet with supervision/diet without supervision/intermittent fasting/raw food/ketogenic/diet based on fruits and-or					
	vegetables/zone diet based on groups of food/Mediterranean/paleo					
	diet/amphetamines/metformin/phentermine/orlistat/Redotex ®/ sibutramine/diuretics/thyroid hormones/unknown					
	or unlabeled pills/carnitine/chrome/Herbalife ®/shakes/smoothies/juices/Pronokal ®/Usana					
	®/acupuncture/magnets/homeopathy					
10	If you ever used any medication, did you stop it because of adverse events or symptoms?					
	a) Yes b) No c) I have never taken weight loss pills					