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Adherence to an overweight and obesity treatment: The *Response Evolution Chart*

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Background. Overweight and obesity affect the psychosocial environment, because obese people experience social stigmatization, which most often limits and excludes them from society. In the treatment of overweight and obesity, diet is considered essential, although it must be integrated into a general program, with physical exercise, modification of lifestyle habits, and psychological support. However, even if weight reductions are achieved, only a small percentage of patients are able to maintain a healthy weight for a long period of time; hence, further studies are warranted to determine other appropriate motivational strategies that can help this patient group succeed in maintaining a healthy lifestyle. The aim of the study is to possibly relate visual changes in an obesity treatment. **Methods.** An observational clinical study was conducted among 110 adult overweight and obese patients who consulted a medical nutrition clinic for nutritional assessment and treatment to improve their aesthetic image and health status over a period of 1year. They were subject to a personalized weekly follow-up consultation over the course of 16weeks that included photographic body image control, which measures the patient's evolution response using an evolution chart. **Results.** Weight loss, reduction in waist circumference, and loss of visceral fat were found to be associated with linear changes in the Response Evolution Chart. Observing the response at the individual level, in men, weight loss, reduction in waist circumference, and loss of visceral fat were found to be associated with linear changes in the motivational picture; in women, only weight loss and reduction in waist circumference were found to be associated with linear changes in the motivational picture ($p<0.05$). **Discussion.**The most important finding in this study is that a relationship was found between weight loss, reduction in waist circumference, and loss of visceral fat, which can serve as a reference in the treatment of overweight or obesity patients regardless of sex. This change was observed in the Response Evolution Chart

when the initial abdominal circumference was compared with that in the final photo (motivational picture). A 6-kg weight loss, a −1 point decrease in visceral fat index, and an 8.5-cm decrease in waist circumference were observed in one line. Greater losses with more lines were noted in the motivational picture.

Adherence to an overweight and obesity treatment: The Response Evolution Chart

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Abstract

Background. Overweight and obesity affect the psychosocial environment, because obese people experience social stigmatization, which most often limits and excludes them from society. In the treatment of overweight and obesity, diet is considered essential, although it must be integrated into a general program, with physical exercise, modification of lifestyle habits, and psychological support. However, even if weight reductions are achieved, only a small percentage of patients are able to maintain a healthy weight for a long period of time; hence, further studies are warranted to determine other appropriate motivational strategies that can help this patient group succeed in maintaining a healthy lifestyle. The aim of the study is to possibly relate visual changes in an obesity treatment.

Methods. An observational clinical study was conducted among 110 adult overweight and obese patients who consulted a medical nutrition clinic for nutritional assessment and treatment to improve their aesthetic image and health status over a period of 1 year. They were subject to a personalized weekly follow-up consultation over the course of 16 weeks that included photographic body image control, which measures the patient's evolution response using an evolution chart.

Results. Weight loss, reduction in waist circumference, and loss of visceral fat were found to be associated with linear changes in the Response Evolution Chart. Observing the response at the individual level, in men, weight loss, reduction in waist circumference, and loss of visceral fat were found to be associated with linear changes in the motivational picture; in women, only weight loss and reduction in waist circumference were found to be associated with linear changes in the motivational picture ($p < 0.05$). The most important finding in this study is that a relationship was found between weight loss, reduction in waist circumference, and loss of visceral fat, which can serve as a reference in the treatment of overweight or obesity patients regardless of sex. This change was observed in the Response Evolution Chart when the initial abdominal circumference was compared with that in the final photo (motivational picture). A 6-kg weight loss, a −1 point decrease in visceral fat index, and an 8.5-cm decrease in waist circumference were observed in one line. Greater losses with more lines were noted in the motivational picture.

Introduction

Obesity is considered a disease of multifactorial etiology, which has a chronic course that involves genetic, environmental, and lifestyle aspects leading to a metabolic disorder; it is characterized by a positive energy balance, which occurs when calorie intake exceeds the energy expenditure causing an increase in body fat deposits and therefore weight gain (Amatruda & Linemeyer, 2001).

From public health point of view, it is important to consider the relationship between body composition, adiposity, and long-term morbidity and mortality (Ford & Mokdad, 2008); the current classification of obesity proposed by the World Health Organization (WHO) is based on

the patient's body mass index (BMI). An individual with a BMI of ≥30 kg/m^2 is considered obese (National Institutes of Health, 2000).

Obesity is one of the most important diseases, with higher prevalence and greater impact worldwide (WHO, 2018).

The WHO considered that the disease have reached pandemic proportions. Approximately 1,500 million people and 2.8 million people die each year due to obesity and overweight, respectively (WHO, 2018).

The relationship between overweight and cardiovascular disease is conditioned not only by the amount of adipose tissue but also by the pattern of fat distribution in the body (Oviedo, Morón de Salim & Solano, 2006). Results of INTERHEART study conducted in Latin America indicated that obesity (particularly abdominal obesity) is responsible for the increase risk for coronary events (Lanas et al, 2007).

The metabolic syndrome, of which obesity is one of its risk factors, is characterized by increased abdominal circumference (overweight and mostly obesity), high blood pressure (>130 mm of systolic Hg and >85 mm of diastolic Hg), high triglyceride levels (>150 mg/dL), high density lipoprotein (Formiguera & Cantón, 2004).

Overweight and obesity affect the psychosocial environment, because obese people experience social stigmatization, which most often limits and excludes them from society; according to the National Nutrition Survey, overweight commonly occurs at the age of 18–64 years. In Barranquilla, Colombia, 54% of the inhabitants aged between 18 and 64 years are overweight, 20% are obese, and 39% have metabolic syndrome (DANE, 2017).

In the treatment of overweight and obesity, diet is considered essential, although it must be integrated into a general program, with physical exercise, modification of lifestyle habits, and psychological support. Even if weight reductions are achieved, only a small percentage of patients are able to maintain a healthy weight for a long period of time; therefore, further studies are warranted to determine other appropriate motivational strategies that can help this patient group succeed in maintaining a healthy lifestyle (Miguel-Soca & Niño-Peña, 2009).

A variety of individual and group psychological therapies have been used to achieve weight loss. In a study carried out in 20 primary care centers in Great Britain, the effectiveness of the motivational interview to modify fat intake, physical activity, and tobacco consumption in 883 patients at high risk of cardiovascular disease was evaluated, obtaining a benefit in the intervention group (Marcos et al., 2014). Motivational interventions alone, in patients with obesity, are more effective even in patients who were only treated with medications for weight

reduction. However, psychological interventions are especially useful when combined with dietary strategies and exercise (Peeters et al., 2003).

Individual responsibility can only have full effect if people maintain a healthy lifestyle; therefore, it is important to highlight that a few studies have been conducted in the field of health, which help people to follow recommendations, through execution of sustained health policies that allow periodic physical activity and healthier food options to be available and affordable for all people (Danielsson et al., 2002).

This research is the continuation of a work published in the Peer J journal (Kuzmar, Rizo & Cortés-Castell, 2014) on 2014, which concluded that body image perception can motivate a patient; the main objective is to relate the photographic changes with the waist perimeter and be able to visually measure the progress in fat loss using a chart.

This study aimed to evaluate patient's response to a motivation evolution chart for a medical nutrition intervention as a continuation of a previous study published in Peer J journal (Kuzmar et al, 2014) on 2014 (Adherence to an overweight and obesity treatment available at: https://www.ncbi.nlm.nih.gov/pubmed/25101227), which concluded that body image perception can motivate a patient; the actual main objective is to compare the photographic changes with the patient's waist perimeter to be able to visually measure the progress in weight and fat reduction using a chart.

Materials & Methods

Participants

An observational clinical study was conducted among 110 adult overweight and obese patients who consulted a medical nutrition clinic for nutritional assessment and treatment to improve their aesthetic image and health status over a period of 1 year. They were subject to a personalized weekly follow-up consultation over the course of 16 weeks. Patients who voluntarily participated in the study, with a clinical diagnosis of overweight, with a clinical diagnosis of obesity, and who desire to improve their aesthetic image and health status were included in the study. This study did not consider those patients who attempted any diet to lose weight in the previous month or earlier. Individuals who are not patients of BiomediKcal –Advanced Medical Nutrition & Lifestyle Center, aged under 18 years or over 99 years, who did not volunteer and sign an informed consent, with no acute disease, and who failed to complete their treatment were excluded. The study follows the Helsinki standards and was approved by BiomediKcal–Advanced Medical Nutrition & Lifestyle Center on March 25, 2018 (approval no. BCE25318) and registered in ClinicalTrials.gov on April 2, 2018 (registration no. NCT03484637); it is a co-research of the Simón Bolívar University of Barranquilla, Colombia; Miguel Hernández University of Elche, Spain; and the University of Alicante, Spain. Informed consent was obtained from all patients (see Fig. 1).

Methods

As our previous findings, changes in nutritional status were observed 3 weeks after continuous treatment: all overweight and obesity parameters have improved (Kuzmar, Rizo & Cortés-Castell, 2014). Methodology can be replicable by researchers as follows:

1. *Preparation of the photographic body image registration area (Fig. 1. Minimum 3.15 m long and 2 m wide):*

    a. The Response Evolution Chart (Kuzmar, 2020) can be downloaded from the following website: https://doi.org/10.6084/m9.figshare.11845335.v1.
    The following technical specifications should not be modified: red zone (40.5 cm): 7 lines and width: 0.5 cm. Five centimeters should be added from the yellow one (24, 29, 34, 39, 44, 49, and 54 cm). Yellow zone (4 cm): 1 line and width: 0.5 cm. Green zone (35.5 cm): 5 lines from 10 cm from the edge, width: 0.5 cm, and height: 14.5 cm.
    b. The image should be opened, adjusted, and printed in an adhesive paper on color plotter printer following the indicated measures: height: 60 cm and width: 80 cm.
    c. The Response Evolution Chart should be posted on a wall 70 cm from the floor, which will face the patient's back and have a minimum distance of 3.05 m from the examiner. See Fig. 2.
    d. On ground: at 55 cm from the wall and in a straight line from the center of the green zone, a feet silhouette (blue or pink) should be posted with a distance of 8 cm with the toes pointing opposite to the direction of the Response Evolution Chart (Kuzmar, 2020) (Fig. 2).
    e. A mark should be placed in the area where the examiner must stand to record the patient´s body image (3.05 m from the wall or 2.50 m from the feet silhouette.

2. *Week no. 1*

    a. Complete medical health assessment (examinee wearing underwear only): physical exploration of systems, checking of vital signs taking, and review of past history if available.
    b. Anthropometric measurements:

        i. Height (CDC, 2017): in a standing position and on barefoot, the patient was asked to remove any hair ornaments, jewelry, buns, or braids from the top of the head; then, the patient was asked to stand against the wall with the body weight evenly distributed, both feet flat on the floor, heels together, and toes apart. Shoulder blades, buttocks, and heels should come in contact with the back-wall. When the head lies in the Frankfort

plane (when the horizontal line from the ear canal to the lower border of the orbit of the eye is parallel to the floor and perpendicular to the vertical backboard), the stadiometer (SECA 206) was adjusted until it rests firmly on top of the participant's head, with sufficient pressure to compress the hair measuring and recording to the nearest 0.1 cm.

ii. Arm perimeter (right side of the body) (CDC, 2017): arm circumference was measured on the right arm by wrapping the measuring tape (SECA 201) around the arm at the level of the upper arm mid-point mark and recording the measurement to the nearest 0.1 cm.

iii. Waist perimeter (right side of the body) (CDC, 2017): the patient was asked to extend the arms forward, and the waist circumference was measured by placing the measuring tape (SECA 201) around the trunk just above the uppermost lateral border of the right ilium in a horizontal plane and checking that the tape sits parallel to the floor and lies snugly but does not compress the skin when the patient is in a standing position at the end of the expiration. The measurement was recorded to the nearest 0.1 cm.

iv. Hip or buttocks perimeter (right side of the body) (CDC, 2017): the patient was asked to extend the arms forward, and the hip circumference just above the underwear, where the maximum protuberance of the buttocks is viewed in profile, was measured while the examiner squats on the right side of the patient and positions the tape (SECA 201) in a horizontal plane and ensured that the tape sits parallel to the floor and lies snugly but does not compress the skin when the patient is in standing position. The measurement was recorded to the nearest 0.1 cm.

v. Tight perimeter (right side of the body): the patient was asked to extend the arms forward, and the right thigh circumference was measured 15 cm proximal to the superior pole of the patella using a measurement tape in a horizontal plane. The examiner ensured that the tape sits parallel to the floor and lies snug but does not compress the skin when the patient is in standing position. The measurement was recorded to the nearest 0.1 cm.

c. Body composition analysis with impedance measurement: weight and body composition were measured using the Tanita MC-780 body composition analyzer (Tanita Corp., Tokyo, Japan).

d. Photograph registration for patient motivation (Kuzmar, Rizo & Cortés-Castell, 2014) and body image control. See Fig. 1:

1. The patient was asked to stand at the feet silhouette and the examiner at the mark.
2. The patient was instructed to place his or her hands on the back of the neck so that the abdominal area is completely visible.

3. The examiner placed the camera at the patient's navel level.
4. A photo of the patient's front view was obtained. A photo of the patient's right side can be obtained but it is optional.

e. Request for paraclinical exams (complete blood count, complete lipid profile, HbA1c, uric acid, and urine test)
f. Provision of an explanation regarding the patient's nutritional status and goal setting
g. Personalized weekly hypocaloric diet guideline
h. Control appointment for the following week

3. *Week no. 2*

a. New medical health assessment (examinee wearing underwear only):
Review of analytical results (complete blood count, complete lipid profile, HbA1c, uric acid, and urine test) and new physical exploration of systems and vital signs if needed for medication prescription
b. Anthropometric measurements: arm perimeter (right side of the body) (CDC, 2017), waist perimeter (right side of the body) (CDC, 2017), hip or buttocks perimeter (right side of the body) (CDC, 2017), and tight perimeter (right side of the body)
c. Body composition analysis with impedance measurement
d. Interpretation of evolution to medical nutritional treatment
e. New personalized weekly hypocaloric diet guideline
f. Control appointment for the following week

4. *Week no. 3*

New medical health assessment (examinee wearing underwear only):
a. Anthropometric measurements: arm perimeter (right side of the body) (CDC, 2017), waist perimeter (right side of the body) (CDC, 2017), hip or buttocks perimeter (right side of the body) (CDC, 2017), and tight perimeter (right side of the body)
b. Body composition analysis with impedance measurement
c. Interpretation of evolution to medical nutritional treatment
d. New personalized weekly hypocaloric diet guideline
e. Control appointment for the following week

5. *Week no. 4*

New medical health assessment (examinee wearing underwear only):
a. Anthropometric measurements: Arm perimeter (right side of the body) (CDC, 2017), waist perimeter (right side of the body) (CDC, 2017), hip or buttocks

perimeter (right side of the body) (CDC, 2017), and tight perimeter (right side of the body)

b. Body composition analysis with impedance measurement
c. Interpretation of evolution to medical nutritional treatment
d. New personalized weekly hypocaloric diet guideline
e. Control appointment for the following week

6. *Week no. 5*

New medical health assessment (examinee wearing underwear only):

a. Anthropometric measurements: arm perimeter (right side of the body) (CDC, 2017), waist perimeter (right side of the body) (CDC, 2017), hip or buttocks perimeter (right side of the body) (CDC, 2017), and tight perimeter (right side of the body)
b. Body composition analysis with impedance measurement
c. Photograph registration for patient motivation (Kuzmar, Rizo & Cortés-Castell, 2014) and body image control
d. Interpretation of evolution to medical nutritional treatment
e. New personalized weekly hypocaloric diet guideline
f. Control appointment for the following week

7. *Week nos. 6–9*

New medical health assessment (examinee wearing underwear only):

a. Anthropometric measurements: arm perimeter (right side of the body) (CDC, 2017), waist perimeter (right side of the body) (CDC, 2017), hip or buttocks perimeter (right side of the body) (CDC, 2017), and tight perimeter (right side of the body)
b. Body composition analysis with impedance measurement
c. Interpretation of evolution to medical nutritional treatment
d. New personalized weekly hypocaloric diet guideline
e. Control appointment for the following week

8. *Week no. 10*

New medical health assessment (examinee wearing underwear only):

a. Anthropometric measurements: arm perimeter (right side of the body) (CDC, 2017), waist perimeter (right side of the body) (CDC, 2017), hip or buttocks perimeter (right side of the body) (CDC, 2017), and tight perimeter (right side of the body)
b. Body composition analysis with impedance measurement
c. Photographs registration for patient motivation (Kuzmar, Rizo & Cortés-Castell, 2014) and body image control

d. Interpretation of evolution to medical nutritional treatment
e. New personalized weekly hypocaloric diet guideline
f. Control appointment for the following week

9. *Week nos. 11 and 15*

New medical health assessment (examinee wearing underwear only):

a. Anthropometric measurements: arm perimeter (right side of the body) (CDC, 2017), waist perimeter (right side of the body) (CDC, 2017), hip or buttocks perimeter (right side of the body) (CDC, 2017), and tight perimeter (right side of the body)
b. Body composition analysis with impedance measurement
c. Interpretation of evolution to medical nutritional treatment
d. New personalized weekly hypocaloric diet guideline
e. Control appointment for the following week

10. *Week no. 16*

New medical health assessment (examinee wearing underwear only):

a. Anthropometric measurements: arm perimeter (right side of the body) (CDC, 2017), waist perimeter (right side of the body) (CDC, 2017), hip or buttocks perimeter (right side of the body) (CDC, 2017), and tight perimeter (right side of the body)
b. Body composition analysis with impedance measurement
c. Photographs registration for patient motivation (Kuzmar, Rizo & Cortés-Castell, 2014) and body image control
d. Interpretation of evolution to medical nutritional treatment
e. Presentation to the patient the motivational picture: comparative image with the evolutionary photos of the treatment performed (Fig. 3)
f. New personalized weekly hypocaloric diet guideline
g. Control appointment for the following week if needed

All analyses were performed using IBM SPSS Statistics version 26.0 software. The normality and comparative nonparametric statistics of data that did not show a normal distribution were checked using Friedman's test. The data can be available upon approval for scientific research under written justified request. A p value of <0.05 was considered significant.

Results

A total of 110 obese and overweight patients were enrolled in the study; of them, 93 (84.5%) obese and overweight patients were included in the analysis, and 17 (15.5%) were excluded. Of the 93 patients, 57 (61.3%) were women and 36 (38.7%) were men. See Table 1. Initial and final BMI data (kg/m^2); photographs; percentage of weight loss and fat loss; arm, waist, hip, and thigh

circumference, and Response Evolution Chart line projection were recorded. The response to treatment in waist perimeter and its relation to the lines in the Response Evolution Chart were measured.

After analyzing the total sample of patients (n = 93), results showed that weight loss, reduction in waist circumference, and loss of visceral fat had a significant association with linear changes in the Response Evolution Chart. Observing patients' response at the individual level, in men, weight loss, reduction in waist circumference, and loss of visceral fat had a significant association with linear changes in the motivational picture; however, in women, only weight loss and reduction in waist circumference had a significant association with the linear changes in the motivational picture ($p < 0.05$).

In the comparative analysis of means (n = 93) in men and women, a 6-kg (3.6 standard deviation [SD]) weight loss, a 1-point (1.1 SD) decrease in visceral fat index, and 8.5-cm (4.8 SD) decrease in waist circumference were observed because of a change in one line in the motivational picture; a 10-kg (6.0 SD) weight loss, a 2-point (1.9 SD) decrease in the visceral fat index, and a 12.4-cm decrease (6.9 SD) in waist circumference were observed because of a change in two lines in the motivational picture; a 13-kg (3.3 SD) weight loss, a 2-point (0.6 SD) decrease in visceral fat index, and almost 14-cm (59.5 SD) decrease in waist circumference were observed because of a change in three lines in the motivational picture; a change in four lines is even greater. See Table 2 and Fig. 4.

In the comparative analysis of men, 6-kg (3.2 SD) weight loss, 2-point (1.2 SD) decrease in visceral fat index, and a 7.3-cm (3.6 SD) decrease in waist circumference were observed because of a change in one line in the motivational picture; a 14-kg (5.8 SD) weight loss, a 4-point (1.8 SD) decrease in visceral fat index, and a 14.2-cm (6.0 SD) decrease in waist circumference were observed because of a change in two lines in the motivational frame; a change in four lines is even greater (Table 2).

When analyzing Table 2, with regard to the group of women (n = 57), a 6-kg (3.8 SD) weight loss, a 1-point (0.9 SD) decrease in visceral fat index, and a 9.4-cm (5.4 SD) decrease in waist circumference were observed because of a change in one line in the motivational table; a 7-kg (4.0 SD) weight loss, a 1-point (0.9 SD) decrease in visceral fat index, and a 10.4-cm (7.5 SD) decrease in waist circumference were observed because of a change in two lines in the motivational frame; this finding suggests that weight loss, waist circumference reduction, and visceral fat reduction are greater when there is a change in more than three lines in the motivational picture.

Discussion

Reduction in patient's weight, waist circumference, and visceral fat were the most important

findings in this study, which can serve as a basis in the treatment of overweight or obese patients regardless of sex. This change was observed in the Response Evolution Chart when the initial abdominal circumference was compared with that in the final photo (motivational picture). It is important to note that in one new line, a 6-kg weight loss, a 1-point decrease in visceral fat index, and an 8.5-cm decrease in waist circumference were noted. Greater losses with more lines were observed in the motivational picture.

The WHO (2018) and researchers worldwide have been developing various strategies to treat obesity (Kushner, 2014; Adler & Stewart, 2009; Stefan, Häring & Cusi, 2019), which shifted from being strongly socially patterned to becoming a more pervasive epidemic; all efforts seem insufficient without getting the best results. The accelerated urbanization of societies favors the appearance of obesity and overwhelms individual control greater among disadvantaged populations (Popkin, Adair & Ng, 2012).

The inequality of opportunity for healthy behavior makes overweight and obesity a social justice issue associated with increased morbidity and mortality (Puhl & Heuer, 2010).

Although many weight loss strategies have been offered to the overweight public and patient-centered treatment options have been selected, practitioners, researchers, and healthcare providers should take an active role in identifying the multifactorial etiology of overweight to identify permanent, effective strategies for weight loss and maintenance (Institute of Medicine (US) Subcommittee on Military Weight Management, 2004). All patients should be provided lifestyle therapy with consideration of different treatment options (Adler & Stewart, 2009).

An effective weight loss program must be focused on preventing unwanted weight gain from excess body fat (Institute of Medicine (US) Subcommittee on Military Weight Management, 2004).

A significant evidence showed that losing excess body fat is difficult for most individuals, and the risk of regaining lost weight is high (Kushner, 2014; Adler & Stewart, 2009; Stefan, Häring & Cusi, 2019, Popkin & Adair, 2012; Puhl & Heuer, 2010; Institute of Medicine (US) Subcommittee on Military Weight Management, 2004).

From the first day of treatment, understanding of the fundamental causes of excess weight gain must be communicated to each individual, along with a strategy for losing fat and maintaining a healthy body weight as a healthy lifestyle (Institute of Medicine (US) Subcommittee on Military Weight Management, 2004).

Our study is the continuation of a previous research published in this journal in 2014 (Kuzmar, Rizo & Cortés-Castell, 2014) and presents a scientific evidence; motivating an overweight or

obese patient must be part of all treatments (Noël & Pugh, 2002; Rodriguez-Cristobal, 2017); therefore, all healthcare providers must have the tools to achieve this objective (Kuzmar, Rizo & Cortés-Castell, 2014). There is no published scientific evidence that provides a tool to visually motivate obese or overweight patients and can be used for medical purposes worldwide.

The present study has some limitations; the sample size was small, and no similar evolution treatment chart that can be used for comparison is currently available. Furthermore, the data analysis by ethnicity was only limited to Latin-American adult individuals.

Our investigation has several strengths. It is the continuation of an investigation carried out by the majority of the research team that are experts in the field of nutrition and was developed in collaboration with three universities (two Spanish and one Colombian). The previous results of the study had a positive impact on the world press (El Mundo, 2016; ScienceDaily, 2016; Postimees, 2016) and the scientific community (Toro-Ramos, 2017), but we were able to determine the need to provide a treatment aid that can be used in any hospital or healthcare provider's office.

Conclusions

When developing an overweight or obesity treatment, it is possible to relate the photographic progress changes with the abdominal perimeters for fat loss and be able to visually control it with a Response Evolution Chart, keeping patient motivated. We invite all health providers worldwide to download and use this new free tool that will serve as an adjunct in the treatment of overweight and obesity and all nutrition scientists to continue the research and determine if the weight and fat losses in their population are similar to those of our study in addition to relating these findings to other new study variables.

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Figure 1

STROBE Flow Diagram

Response Evolution Chart STROBE Flow Diagram

STROBE Statement

Strengthening the reporting of observational studies in epidemiology

Response Evolution Chart - STROBRE Flow Diagram[1,2]

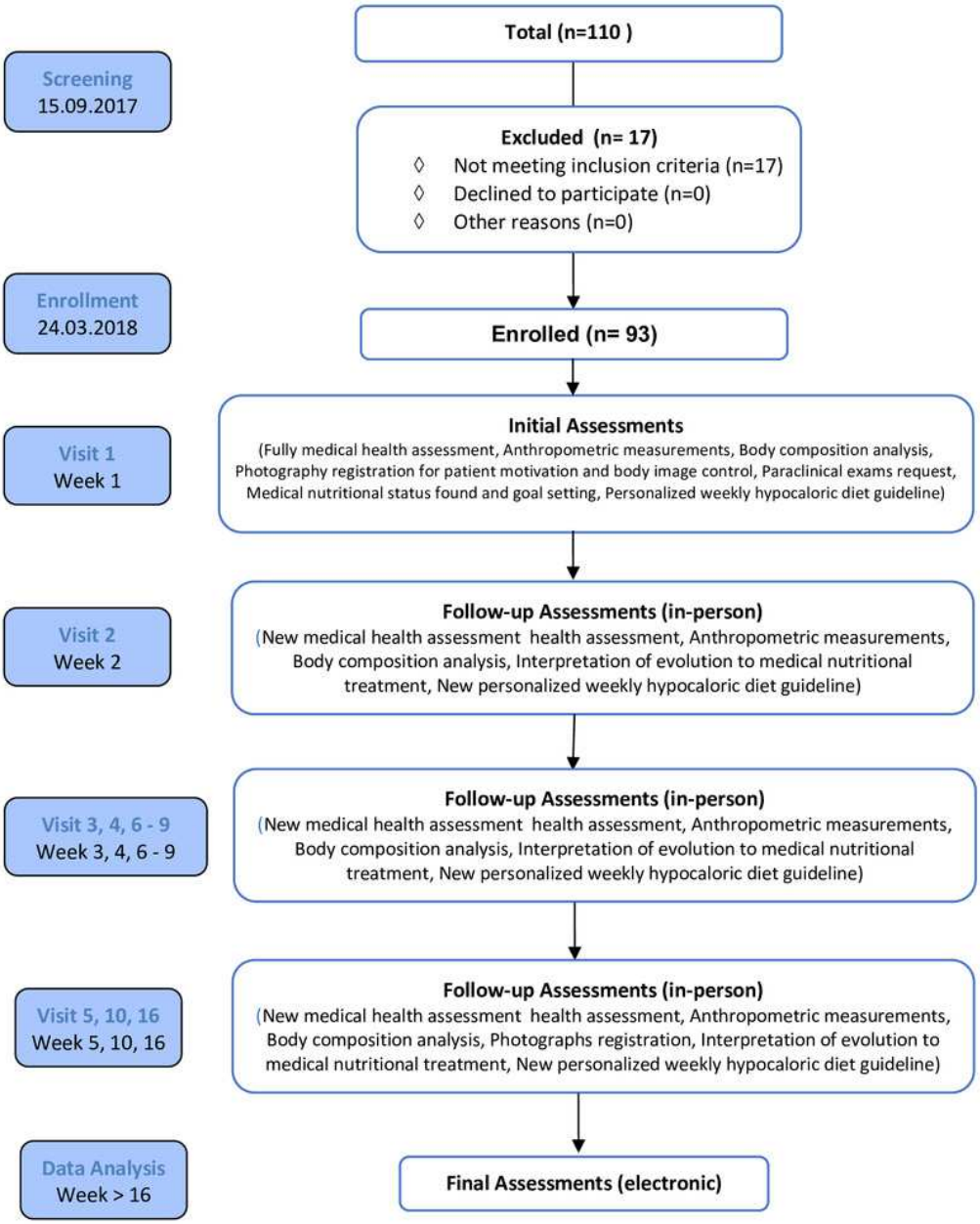

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Figure 2

Correct use and specification

Correct use and specification of the Response Evolution Chart for Body Image control

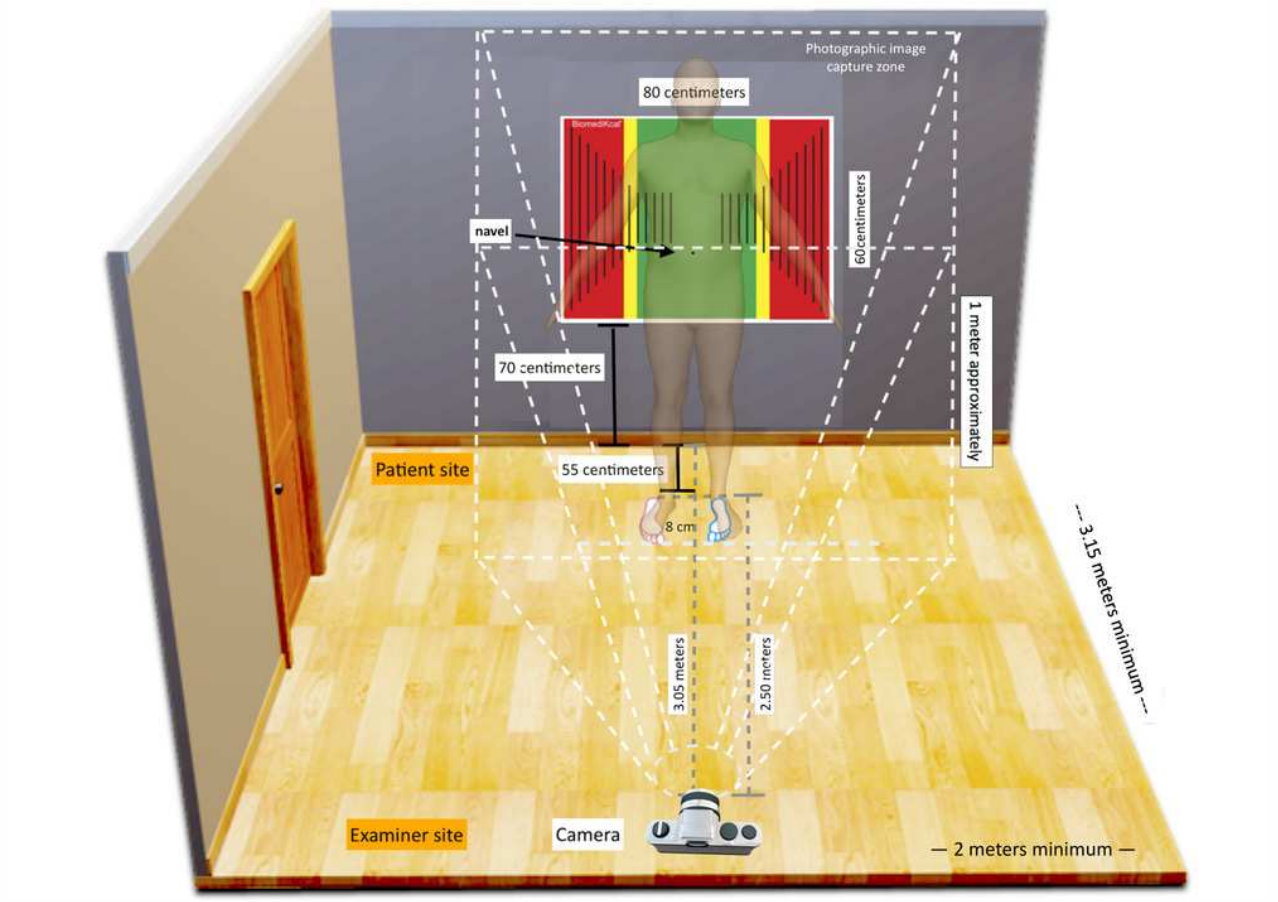

Photographic image capture zone
80 centimeters
navel
60centimeters
1 meter approximately
70 centimeters
Patient site
55 centimeters
8 cm
3.15 meters minimum
3.05 meters
2.50 meters
Examiner site
Camera
2 meters minimum

Figure 3

Motivational picture comparative image example

Presentation to the patient the motivational picture comparative image with the evolutionary photos of the treatment performed .pdf

Table 1(on next page)

Descriptive Statistics

All data indicate the descriptives statistics

Descriptive Statistics	Total Enrolled, N=110 Excluded, N=17 (15.5%)					
	Total N= 93(84.5%)		Male N=36 (38.7%)		Female N=57 (61.3%)	
	Mean	SD	Mean	SD	Mean	SD
Age (years)	41.4	10,9	41.8	11.3	41.1	10.8
High (cm)	165.2	8.7	173.2	6.9	160.2	5.3
Weight initial (kg)	84.9	16.9	98.3	14.1	76.4	12.6
Weight final (kg)	78.1	14.8	89.7	13.1	70.8	10.4
DifWi Wf (kg)	6.8	5.4	8.6	6.6	5.6	4.2
BMI i	30.9	4.9	32.7	4.7	29.7	4.6
BMI f	28.5	4.1	29.9	4.3	27.6	3.8
BMR i (Kcal)	1690	352	2053	224	1461	186
BMR f (Kcal)	1599	324	1936	217	1386	153
Arm perimeter i (cm)	33.3	3.5	35.0	3.1	32.2	3.3
Arm perimeter f (cm)	31.3	3.2	33.2	3.1	30.1	2.7
Waist perimeter i (cm)	99.2	17.3	110.6	10.1	92.1	17.0
Waist perimeter f (cm)	90.1	13.1	100.7	9.8	84.7	11.0
Dif Waist i – Waist f (cm)	8.4	11.5	9.9	6.9	7.4	13.6
Hip perimeter i (cm)	110.1	8.6	109.8	8.8	110.3	8.6
Hip perimeter f (cm)	115.2	10.5	104.8	7.8	121.7	13.4
Thigh perimeter i (cm)	61.6	5.9	61.1	5.5	61.8	6.3
Thigh perimeter f (cm)	57.7	4.9	57.2	4.9	57.9	4.9
Waist/Hip index i	0.9	0.1	0.9	0.1	0.9	0.1
Waist/Hip index f	0.9	0.1	0.9	0.1	0.8	0.1
Hip/Thigh index i	1.6	0.2	1.8	0.1	1.5	0.2
Hip/Thigh index f	1.6	0.2	1.8	0.1	1.5	0.2
Fat Mass i (kg)	32.8	32.6	38.3	51.5	29.3	7.6
Fat Mass f (kg)	25.2	7.1	24.3	8.0	25.7	6.6
Fat Mass% i	34.8	5.8	29.9	4.5	37.9	4.2
Fat Mass% f	32.2	6.4	26.5	4.8	35.9	4.4
Fat Free Mass i (kg)	54.9	12.2	67.6	8.7	47.0	5.8
Fat Free Mass f (kg)	52.8	11.6	64.8	8.3	45.2	5.1
Fat Free Mass% i	64.9	5.6	69.5	4.7	62.1	4.1
Fat Free Mass% f	67.3	6.7	72.5	6.5	64.2	4.5
Visceral Fat Index (VFI) i	9.9	4.2	13.8	3.5	7.4	2.4
Visceral Fat Index (VFI) f	8.4	3.6	11.3	3.3	6.5	2.2
Dif VFIi-VFIf	1.5	1.6	2.5	1.9	0.9	0.9
Metabolic Age i (years)	49.9	9.4	51.3	9.1	49.1	9.6
Metabolic Age f (years)	46.7	9.7	47.9	8.9	45.9	10.1
Linear Indicator i	6.0	1.4	5.1	1.0	6.7	1.2
Linear Indicator f	7.2	1.2	6.4	1.0	7.8	0.9
Linear Change (f-i)	1.1	0.7	1.4	0.7	1.1	0.7

Table 2(on next page)

Response Evolution Chart Report

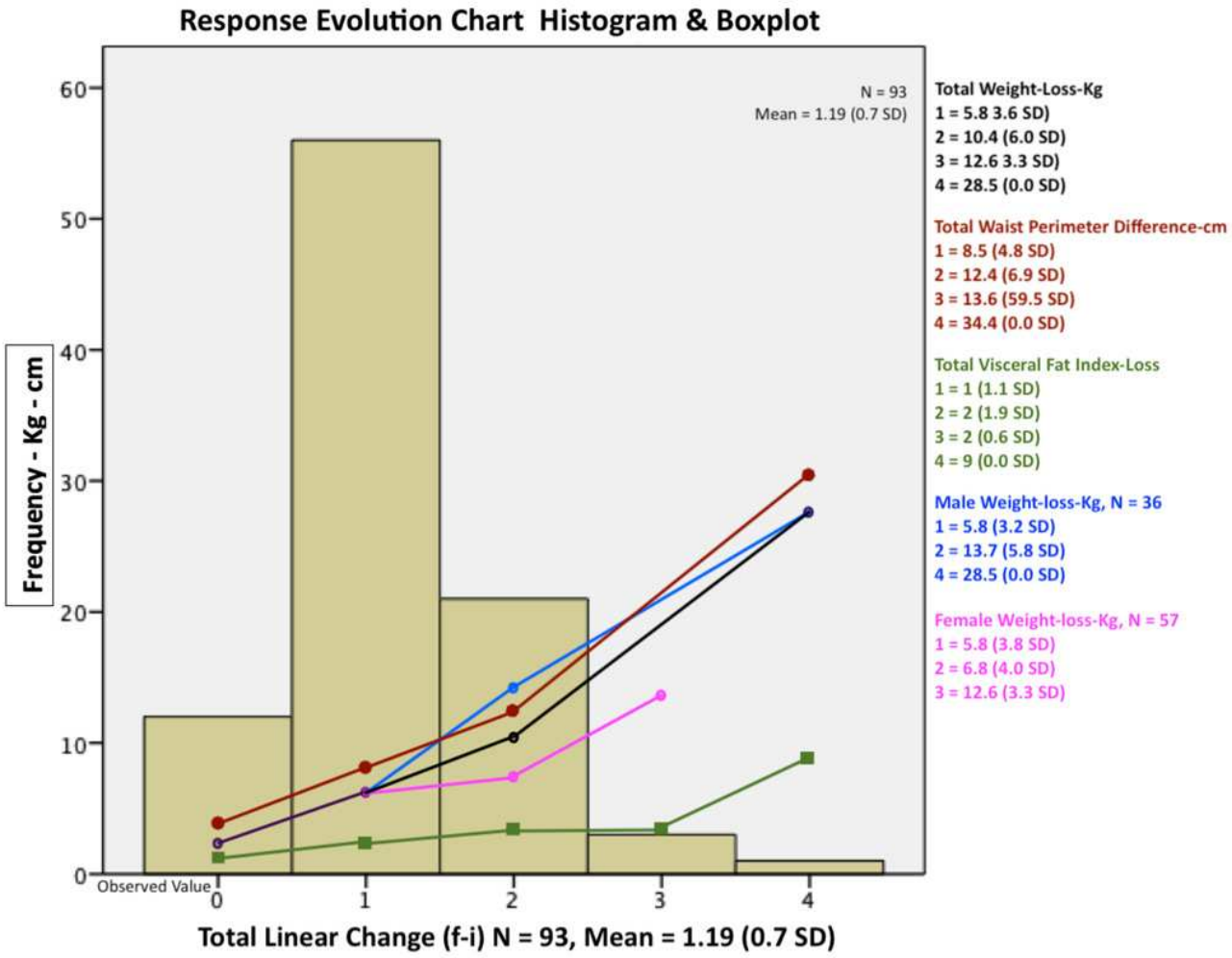
Response Evolution Chart Report after 12 weeks continuous medical nutrition program.

Response Evolution Chart Report											
Linear Change (f-i)		Dif Weight (f-i) kg			Dif VFIf-VFIi			Dif Waist (f-i) cm			*p<0.05*
		Total	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**	
0	N	12	2	10	12	2	10	12	2	10	0.00
	Mean	1.8	2.2	1.8	0.6	3.2	4.0	3.9	1	1	
	SD	1.9	4.7	1.3	0.7	1.6	3.0	2.8	1.4	0.5	
1	N	56	22	34	56	22	34	56	22	34	0.00
	Mean	5.8	5.8	5.8	1.0	7.3	9.4	8.5	2	1	
	SD	3.6	3.2	3.8	1.1	3.6	5.4	4.8	1.2	0.9	
2	N	21	11	10	21	11	10	21	11	10	0.00
	Mean	10.4	13.7	6.8	2.0	14.2	10.4	12.4	4	1	
	SD	6.0	5.8	4.0	1.9	6.0	7.5	6.9	1.8	0.9	
3	N	3	0	3	3	0	3	3	0	3	0.00
	Mean	12.6	0.0	12.6	2.0	0.0	13.6	13,60	0.0	2	
	SD	3.3	0.0	3.3	0.6	0.0	59.5	59.5	0.0	0.6	
4	N	1	1	0	1	1	0	1	1	0	0.00
	Mean	28.5	28.5	0.0	9.0	34.4	0.0	34.4	9	0.0	
	SD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total	N	93	36	57	93	36	57	93	36	57	
	Mean	6.8	8.6	5.6	2	9.9	7.4	8.4	2	1	
	SD	5.4	6.6	4.2	1.6	6.9	13.6	11.5	1.9	0.9	

Figure 4

Graphic evolution

Histogram and box plot overlaid graphs


Response Evolution Chart Histogram & Boxplot
N = 93
Mean = 1.19 (0.7 SD)
Frequency - Kg - cm
Observed Value
Total Linear Change (f-i) N = 93, Mean = 1.19 (0.7 SD)
Total Weight-Loss-Kg
1 = 5.8 3.6 SD)
2 = 10.4 (6.0 SD)
3 = 12.6 3.3 SD)
4 = 28.5 (0.0 SD)
Total Waist Perimeter Difference-cm
1 = 8.5 (4.8 SD)
2 = 12.4 (6.9 SD)
3 = 13.6 (59.5 SD)
4 = 34.4 (0.0 SD)
Total Visceral Fat Index-Loss
1 = 1 (1.1 SD)
2 = 2 (1.9 SD)
3 = 2 (0.6 SD)
4 = 9 (0.0 SD)
Male Weight-loss-Kg, N = 36
1 = 5.8 (3.2 SD)
2 = 13.7 (5.8 SD)
4 = 28.5 (0.0 SD)
Female Weight-loss-Kg, N = 57
1 = 5.8 (3.8 SD)
2 = 6.8 (4.0 SD)
3 = 12.6 (3.3 SD)