EFFICACY OF SUBCUTENOUS STIMULATION IN INDIVIDUALS WITH GRADE 1 OBESITY

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Abstract:

Background:

Obesity is a considerable epidemic health complications; the prevalence of increasing body weight indicates that we are reaching to a situation that will be difficult to reverse. Obesity is one of the leading cause of CVD, Diabetes, Cancer (colorectal),

Mostly treatments to reduce body fat are expensive or they possess massive side effects like medications and surgical approaches where as comprehensive modifications for instance Diet, Physical activity and Behavioural therapy are time consuming and emotionally stressful so the integration of subcutaneous stimulation will be able to produce cost effective and timely results.

Methods:

This Quasi-Experimental study will be conducted at Department of Rehabilitation Sciences of Ziauddin Hospital Clifton Karachi, to investigate the efficacy of subcutaneous stimulation in reducing waist circumference in individuals with grade 1 obesity.

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All participants will be assessed by pre and post BMI, waist circumference, at the start and end of the 12th session while the number and while waist circumference The first 3 sessions will be consecutive and will be followed by 9 sessions on alternate days. Collected data sets were analyzed by SPSS-Version 20

Results:

The result of this study shows that high frequency current therapy is helpful in reducing waist circumference and abdominal obesity because the current produces heating effect that increases blood supply of the tissue leading to mobilization of fat or in other words facilitation of the lipolysis process.

Conclusion:

The result of this study shows that subcutaneous stimulation has significant effects in reducing fat around the abdominal area. This protocol helped in mobilizing the fat that indirectly toned up the abdominal muscles.

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INTRODUCTION

Obesity and excessive weight are coined as a combination of disease that shows increased and abnormal deposition of fat cells in body directing to harmful effects over health. Obesity exert firm control over destruction of health and financial damage on individuals, community and society. Regardless of the remarkable efforts in increasing the awareness among society, the pervading of obesity continues at an alarming rate.

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Over 50% of the European population is overweight and up to 30% is obese with prevalence worldwide increasing two fold since 1980 [WHO] (Mahmoud Abdelaal et al,.2017)

Obesity is not only confined to a particular region. In 2015- 2016 US had 39.8% adults fall in category of obesity where as 18.5% of prevalence is among young individuals. Prevalence of obesity among adult individuals aged between 40-59 was higher than among young adults aged 20-39 (Craig M. Hales, et al 2017).

In 2008, around 200 million men and approximately 300 million women were assessed to be fat, this shows over 10% of the world's adult people. Aside from these 1.4 billion grown-ups were overweight (T. Soleymani, et al 2015.)

Obesity is a considerable epidemic health complications; the prevalence of increasing body weight indicates that we are reaching to a situation that will be difficult to reverse. As a result, there is a stress on public health programs that aim over the primary prevention of obesity, but they must be accompanied by policies and approaches to manage the disease in people who are

already obese. Individuals that are overweight and obese with any related known disease must be able to access secondary prevention and treatment, or tertiary interventions if they are related to complications associated with over weight (T. Soleymani, et al 2015)

Genetic factors records for approx. 70% of the difference in BMI in life of an adult. Body composition, distribution of fat and visceral fat deposition after over indulging to food share a same genetic component (Mahmoud Abdelaal et al,.2017).

Abdominal fat tissue appropriation reflects metabolic hazards. Many investigations show that abdominal subcutaneous fat tissue is the least metabolically hurtful capacity site of excess fatty tissues. Other detailed investigations have appeared expanded visceral/intra-stomach fat is a marker of expanded ectopic fat in different destinations, for example, the liver and the heart, along these lines, stomach fat circulation would now be able to be viewed as a marker of ectopic fat in various areas. Additionally, these examinations pad disturbed fat, and not subcutaneous fat, as the driver of metabolic entrapments.

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There are numerous treatment choices, for example, far reaching way of life intercession (diet, physical movement and behavioural treatment

The Obesity Guidelines prescribe the essentialness lack of 500 to 750 kcal/d, which can be practiced by prescribing 1,200 to 1,500 kcal/d for ladies and 1,500 to 1,800 kcal/d for men. an assortment of eating regimens can be consolidated into way of life intercessions, including proof based eating regimens that confine particular kinds of nourishments (e.g. high starch, high-glycaemic value All eating regimens, paying little mind to macronutrient structure, will deliver weight reduction if a steady caloric deficiency is accomplished (Naji Alamuddin, et al. 2016).

It is suggested for patients to restrict non-academic screen time to 1 to 2 hours out of every day and decrease other stationary practices, for example, advanced exercises. encourage the decrease of in activity and furthermore at least 20 minutes of moderate to enthusiastic physical

movement day by day, with an objective of an hour, all with regards to a calorie-controlled eating regimen(Dennis M. Styne, et al,. 2017).

Along with this pharmacologic treatment and surgical treatment are also available and commonly used: (8) Weight reduction medications are shown for grown-ups with a BMI ≥ 30 kg/m2 (or a BMI ≥ 27 kg/m2 with somewhere around one weight-related comorbidity) who are unfit to decrease effectively with way of life mediation alone. Pharmacotherapy encourages adherence to dietary suggestions by lessening hunger or expanding satiation.

PROBLEM STATEMENT:

To evaluate efficacy of subcutaneous stimulation in reducing waist circumference in individuals with grade 1 Obesity

RESEARCH OBJECTIVES:.

- To investigate the effects of electrical stimulation on waist circumference of individuals.

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METHODOLOGY

STUDY SETTING: Rehabilitation Sciences Out Patient Department (OPD) Ziauddin Hospital Clifton, Karachi.

TARGET POPULATION: Grade 1 Obese both male/female

STUDY DESIGN: Quasi-Experimental

DURATION OF STUDY: 06 months, subjected to the date of approval of research.

SAMPLE SIZE: …….. Individuals with grade 1 Obesity

SAMPLE SELECTION:

Inclusion criteria:

- male/female with diagnosed grade 1 Obesity
- BMI >30 kg/m2
- Age: 18-45 years.

Exclusion criteria:

- Individuals with cancer, infection, high velocity trauma and fracture.
- Individuals with hx of cardiovascular disease
- Patients with BMI <30 kg/m 2
- Pregnant women.
- Individuals with recent abdominal surgeries, bariatric surgeries and unexplained weigh gain cannot participate in study.
- Smoker or drinking habit.
- Participant with any neurological, psychological and cardiopulmonary disorder.
- Individuals who are diagnosed with Red flags
- Individuals currently in an acute inflammatory phase of known gastrointestinal or urinary diseases (such as cholecystitis, renal stones, appendicitis or peritonitis)
- Taking blood thinning medications/anti-coagulants.

DATA COLLECTION PROCEDURE:

Assessment tools:

Following tools will be used for data collection:

- BMI

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- waist circumference

Procedure:

This Quasi-Experimental study will be conducted at Department of Rehabilitation Sciences of Ziauddin Hospital Clifton Karachi, to investigate the efficacy of subcutaneous stimulation in reducing waist circumference in individuals with grade 1 obesity. Informed consent in black and white will be obtained from the participants and assessor will make sure that every The technique will be clearly explained to the patient before starting the procedure and it will be ensured that the confidentiality and privacy of the participants is maintained.

TREATMENT PROTOCOL

All participants will be assessed by pre and post BMI, waist circumference, skin fold, bio electrical impedance at the start and end of the 12th session while the number and while waist circumference and skin fold will also be assessed on 6th session The first 3 sessions will be consecutive and will be followed by 9 sessions on alternate days.

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Procedure

Subcutaneous stimulation

-It will involve intermittent percutaneous stimulation by using dry needles over abdominal muscles. This will take approximately 20-30 mints.

DATA ANALYSIS PROCEDURE

The data will be stored and analysed by using SPSS version 23.0. The frequency will be applied for demographic data while the test of normality will be used for categorical data. P-values less than 0.05 will be considered significant.

ETHICAL CONSIDERATION

The research will be conducted keeping focus on ethical consideration for participants. Confidentiality, privacy, anonymity and dignity of all participants will be maintained throughout the research. The data will be kept confidential and will be only accessed by authorize personals. Informed consent will be obtained prior to conduction of the research procedure**.**

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RESULT

The measurements of BMI, waist circumference, skin fold and bio electrical impedance were taken of the remaining forty-two participants and were instructed not to follow any additional diet plan, exercise regime and lifestyle modification except for the daily routine activities during the course of study. Table 1 shows mean age, weight and height of male and female.

Table 1 shows Summary statistics table of Demographic data.

	MALE					FEMALE				
	Mean	95% CI	SD	RSD	Normal Distr.	Mean	95% CI	SD	RSD	Normal Distr.
AGE	34.11	30.60 to 37.62	6.82	0.20	0.98	29.24	26.82 to 31.65	5.84	0.20	0.06
HEIGHT IN CM	165.70	162.1 to 169.2	6.92	0.04	0.05	161.4	159.17 to 163.70	5.48	0.03	0.0089
WEIGHT IN LB	150.18	136.6 to 163.7	26.28	0.17	0.02	146.12	136.17 to 156.08	24.10	0.16	0.0025

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Table 2 shows Summary statistics table of Waist and Hip Ratio- Wilcoxon test (paired samples)

	Sample 1 waist and hip ratio Pre treatment	Sample 2 waist and hip ratio Post treatment
Sample size	42	42
Lowest value	0.72	0.68
Highest value	0.94	0.80
Median	0.80	0.71
95% CI for the median	0.77 to 0.82	0.71 to 0.73
Interquartile range	0.76 to 0.83	0.69 to 0.75

Table 02 shows that, there was significant difference between pre and post rehabilitation values of waist circumference in all forty-two participants. The values of waist circumference taken

before starting the protocol was and once the combination therapy of needling and interferential current was applied waist circumference decreased.

DISCUSSION

The purpose of this study was to investigate the effects of subcutaneous electrical stimulation in reducing waist circumference of individuals with grade 1 obesity. Fifty participants were selected on the basis of inclusion and exclusion criteria in which eight were dropout due to certain reasons such as time restraint, transport issues and loss of contact. The measurements of BMI, waist circumference, skin fold and bio electrical impedance were taken of the remaining forty-two participants and were instructed not to follow any additional diet plan, exercise regime and lifestyle modification except for the daily routine activities during the course of study. The rehabilitation protocol of 12 sessions was performed in such a way that 3 sessions were consecutive followed by 9 sessions on alternate days for a 30-40 min of duration. The measurements of all four parameters BMI, waist circumference, skin fold and bio electrical impedance was taken before starting the protocol and on 12^{th} session.

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There was no supporting evidence or literature to consider the effects of dry needling in reducing waist circumference by stimulating abdominal muscles through interferential current. It is a novel study that investigated the effect of needling around the abdomen that was stimulated through interferential current to reduce the belly fat. This present study is in agreement with the study conducted by (Young- Han and Jung-Ho, 2017) which suggested that interventional current treatment applied around the abdomen could lessen the midsection circumference and fat length. In addition to this Jin-seop and Duck-won, 2015 concluded that high frequency current therapy is helpful in reducing waist circumference and abdominal obesity because the current produces heating effect that

increases blood supply of the tissue leading to mobilization of fat or in other words facilitation of the lipolysis process.

All forty-two participants were adults within the age range of 18-45 years and body mass index (BMI) of >30. Needles were inserted around the abdominal area then interferential current was applied to those needles. High interferential current along with needles decrease the capacitance resistance so it can easily pass through the skin and stimulate internal tissues effectively. The current breaks fatty capsule around the muscles thus improving its blood supply that in turn helps to gain the lost tone to return to its original size. This combination has the ability to stimulate large number of muscular fibers, increase of blood flow in the abdominal region and tone up the body.

Additionally, there was significant difference between pre and post rehabilitation values of waist circumference in all forty-two participants. The values of waist circumference taken before starting the protocol was and once the combination therapy of needling and interferential current was applied waist circumference decreased to. This present research is in accordance with the study conducted by J.petrofsky 2009 that concluded that interferential current has the ability to pass through fat layer towards the muscle and strengthen it .This strengthening of the muscle then tone up the abdominal area.

Along with BMI and waist circumference there was substantial decrease abdominal, muscles after rehabilitation protocol was applied. The values of the waist circumference before were and decreased to after 12 sessions. The combination of interferential current with needling strengthened the muscles and broke the fat capsule that in turn toned up the abdominal area. In addition to these parameters the bioelectric impedance also improved in all forty-two participants once the protocol was applied. As the fat layer around abdominal

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area decreased the resistance produced by adipose tissue also decreased leading to increase in bioelectric impedance.

CONCLUSION:

The result of this study shows that subcutaneous stimulation has significant effects in reducing fat around the abdominal area. This protocol helped in mobilizing the fat that indirectly toned up the abdominal muscles.

LIMITATION

The limitation of this study is the short observation period and lack of follow-up. Further studies should be conducted to determine the long term and permanent impact of subcutaneous stimulation in reducing the waist circumference of individuals with grade 1 obesity.

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