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An Application of t-test- Approach in Prevention of Overweight

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ABSTRACT

These days overweight is a public health problem that has become epidemic worldwide. The Over consumption of food and sedentary lifestyle is the main cause of weight gain and it can lead to certain diseases such as type II Diabetes, high blood pressure, breathing problems etc? So the prevention of overweight is of great importance. For this, people choose many options such as cycling, tread mill, jogging, etc. or they also prefer slimming techniques. This paper is one in a series establishing a relationship between regular exercises done by a person and a slimming treatment taken by a person in a gym where the diet plan is same for both of them. For this, t-test has been applied to study whether any significant difference is observed between the two or not.

1. Introduction

How would you feel if people make fun of you because you are overweight? Have you ever felt like you cannot do certain things because of your overweight? Many people in our society feel like this every day. Our sedentary lifestyles, in which there is a lack of substantial physical exercise and prolonged sitting tasks, are the main cause of overweight. Even the number of children who are overweight is growing at an alarming rate. They are frequently teased and excluded from team activities, which can lead to low self-esteem, negative body image, and depression This problem of overweight can even put a person's life at risk of serious health problems including as type II Diabetes, high blood pressure, breathing problems etc. Also, diagnosing and treating weight problems as early as possible may reduce the risk of developing these and other serious medical conditions. We are discussing here the two treatments A and B, to reduce weight. In the first treatment, people do regular exercises in the gym such as tread mill, cycling, cardiovascular exercises etc. This treatment requires a lot of hard work and good stamina. But it is not a cup of tea for everyone as many people like heart patients, asthma patients, people suffering from knee problem or children under the age of 12 cannot do these exercises. So, we have a discussed a second treatment which is a slimming technique and people of any age group can easily undergo this treatment. This technique is free from any kind of surgeries or medicines. Also, this treatment yields immediate and long lasting results. Most of the clients experience 2 to 10 cm of circumference reduction after a single session with increasing results after each visit. The results may vary with different tissue structure, treatment area, age, metabolism, medications, and changes in hormones. Proper diet and increased physical activity will certainly improve and help to maintain the results.

Null Hypothesis: There is no significant difference between the two treatments A and B with regard to their effect on decrease in weight.

Alternate Hypothesis: There is a significant difference between the two treatments A and B with regard to their effect on decrease in weight. Moreover, treatment B is better.

2. Research design and methodology

The study is conducted in *Anzo fitness planet gym*. Total 20 patients are taken of various ages. These people are divided into two groups A and B. In group A, there are 5 males and 5 females. In group B, there are 4 males and 6 females. The time period is 3 months. All the patients follow a diet plan and the undergo the respective treatment and their weight is calculated before and after the treatment and compared.

3. Procedure

All the 20 persons are divided into two groups A and B.

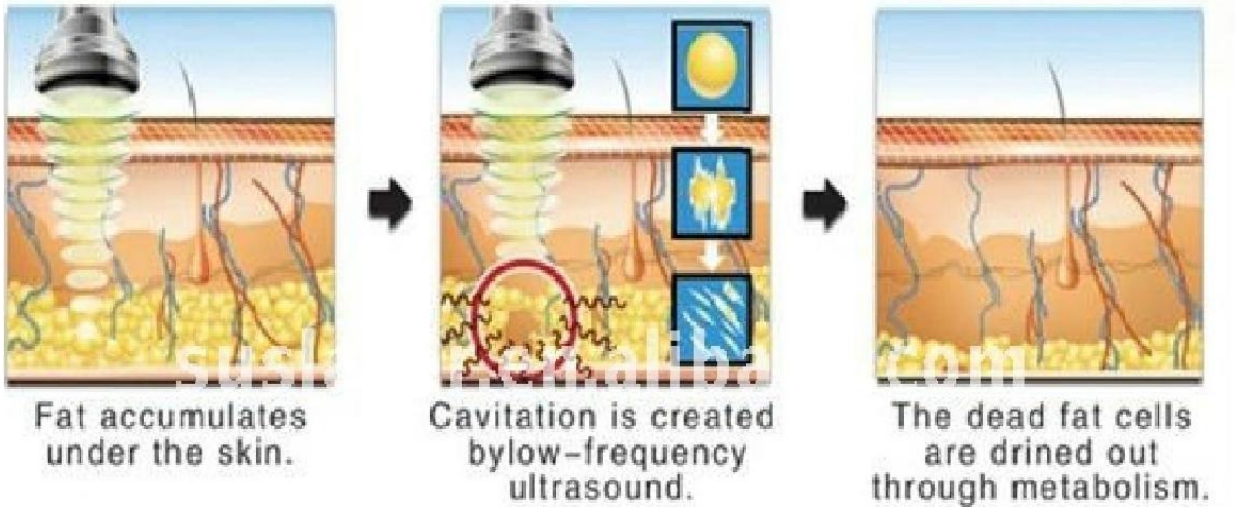
Group A: Group A has 10 persons. They follow a proper diet plan along with it they also do regular exercises in the gym such as treadmill, cycling, air walker, vibrator and cardio muscular exercises.

- Treadmill: It is a device generally for walking or running while staying in the same place as it provides a wide
- Conveyor belt driven by an electric motor or a flywheel. The belt moves to the rear, requiring the user to walk or run at a speed matching that of a belt. The treadmill burns the most calories of any of the cardiovascular
- Machines. You can expect to burn about 100 calories per mile, walking briskly.
- Air-Walker: It simulates a walking or jogging motion with pedals that travel in a smooth, arched path. Air Walkers target muscles in your arms and your legs
- Stationary Bikes: The stationary bike offers the workout with the least impact on the joints.

Group B: Group B has 10 persons. They also follow the same diet plan as Group A but in this case they undergo a Slimming treatment, Cavitations, without medicines and any kind of surgery. Cavitation is a natural phenomenon based on low frequency ultrasound. The ultrasound field creates the bubbles in the liquid, which gradually grow, and implode at certain size. The energy in the form of heat (minor effect) and pressure wave (major effect) is released. As the membranes of fat cells do not have the structural capacity to withstand the vibrations, the effect of cavitation easily breaks them, while sparing the vascular, nervous and muscular tissue. The result is instant fat loss. After disruption of adipose cells, the fat in the form of triglycerides is released into the interstitial fluid between the cells, where they are enzymatic ally metabolized to glycerol and free fatty acids. Water soluble glycerol is absorbed by the circulatory system and used as the energy source, whereas the insoluble free fatty acids are transported to the liver and processed as fatty acids from food.

Lipo laser machine

Cavitation Slimming Technique



4. Data Analysis

Paired t test has been applied to compare the relationship between the two treatments. The decrease in weight after these two treatments has been recorded. The Null and Alternate Hypothesis are:

H_o : There is no significant difference between the two treatments A and B with regard to their effect on decrease in weight

H_1 : There is a significant difference between the two treatments A and B with regard to their effect on decrease in weight

Where X_1 denotes the decrease in weight of the people in group A (regular exercises in the gym) and X_2 denotes the decrease in weight of the people in group B(slimming treatment in the gym)

Test Statistic: The test statistic is

$$t = \frac{\bar{X}_1 - \bar{X}_2}{S}\sqrt{\frac{n_1 n_2}{n_1 + n_2}}$$

Where $\bar{X}_1$ = mean of the first sample (Group A)

$\bar{X}_2$ = mean of the second sample (Group B)

n_1 = number of observations in the first sample

n_2 = number of observations in the second sample

S = combined standard deviation

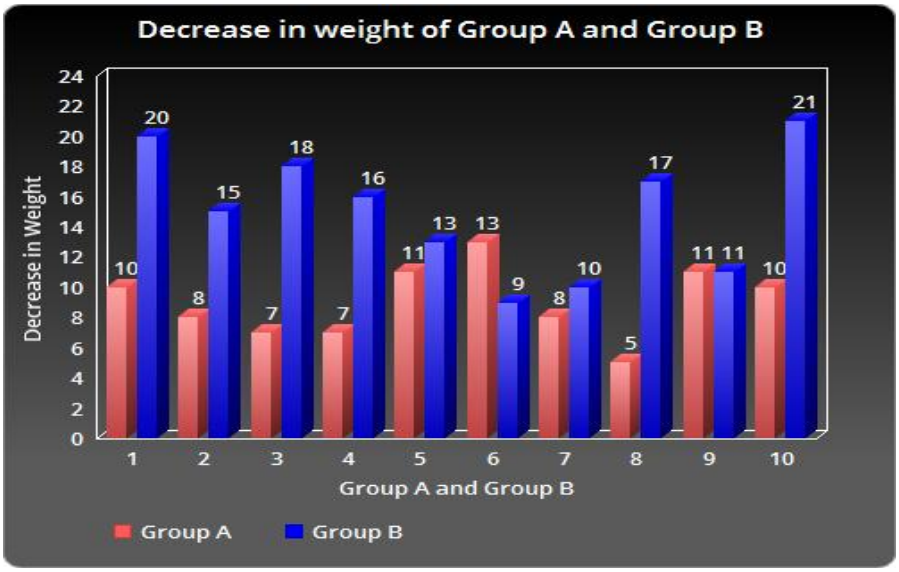
The value of S is calculated by the following formula:

$$S = \sqrt{\frac{\sum\left(X_1 - \bar{X}_1\right)^2 + \sum\left(X_2 - \bar{X}_2\right)^2}{n_1 + n_2 - 2}}$$

The calculated value of t has been compared with table value at 5% level of significance and for $n_1 + n_2 - 2$ degree of freedom.

Decrease in weight of Group A and Group B

Decrease in weight by Treatment A in 3 months	Decrease in weight by Treatment B in 3 months
10	20
8	15
7	18
7	16
11	13
13	9
8	10
5	17
11	11
10	21



5. Result

t - test analysis of the persons undergoing treatment A and B. paired t - test Analysis says that if the calculated value of $|t|$ is less than the tabulated value of t at the 5% degree of freedom, then the Null Hypothesis H_0 is accepted and if the calculated value of $|t|$ is greater than the tabulated value of t at the 5% degree of freedom, then the Null Hypothesis H_0 is rejected and Alternate Hypothesis H_1 is accepted. So, by using the above test statistic and data, the value of t as following:

$$t = -3.94$$

Tabulated value of $t_{0.05}$ for $(10+10-2)=18$ degree of freedom is 2.10

Hence the calculated value of $|t|$ is greater than the tabulated value of t at 5% level of degree of freedom. So, Null Hypothesis H_0 is rejected and the Alternate Hypothesis H_1 is accepted. It means there is a significant difference between the two treatments A and B with regard to their effect on decrease in weight. Moreover, treatment B is better.

6. Conclusion

From the study, we conclude that although both the treatments reduce weight but treatment B is more effective than treatment A. The cavitations treatment yields immediate and long-lasting results. Most of the clients Experience 2 to 10 cm of circumference reduction after a single session with increasing results after each visit. Proper diet and increased physical activity will certainly improve and help to maintain the results.

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