

## Quantification Of Depression In Exercising Vs Non-Exercising Obese Subjects

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**ABSTRACT:** Background: Obesity has risen to one of the most prevalent nutritional problem in the world and not only poses a threat to the physical health, but is also linked to deterioration of mental health, commonly giving rise to depression and anxiety. A strong link between obesity and depression has been established previously. Exercising has been proven to effectively combat depression, when used in conjunction with Cognitive Behavioral Therapy and other modes of treatment. Since, positive influence of exercise on depression, especially in obese population has not received significant attention previously, this study is aimed to quantify the difference in depression using Major Depressive Inventory scale in non-exercising and exercising obese subjects over a period of 6 months. Material and Methods: Major Depressive Inventory (MDI) is a self-report mood questionnaire developed by WHO to measure levels of depression. Exercising obese subjects (N=30), non-exercising obese subjects (N=30) were assessed for depression using the MDI scale.

Results: Non-exercising obese subjects were found to have higher level of depression ( $p=22.169$ ) as compared to exercising obese subjects ( $p=12.149$ ).

Conclusion: Exercises have a strong and positive impact on depression in obese subjects.

**KEYWORDS:** obesity, depression, exercises, mental illness, major depressive Inventory, treating depression, body mass index, endorphins

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### I. INTRODUCTION

Over the last 20 years, obesity has become one of the most prevalent nutritional problem in the world and is a significant contributor to ill health and mortality. Latest statistical projections indicate that globally, in 2005 there were approximately 1.6 billion overweight adults (15 years and over), and at least 400 million obese<sup>1</sup>. According to the Obesity Medicine Association, obesity is a chronic, relapsing, multifactorial, neurobehavioral disease, wherein an increase in body fat promotes adipose tissue dysfunction and abnormal fat mass physical forces, resulting in adverse metabolic, biomechanical, and psychosocial health consequences.<sup>2</sup> Unfortunately, obesity is not taken seriously. It is looked down as a mere cosmetic problem for which no medical help is sought<sup>3</sup>. Body Mass Index (BMI) is a widely used tool to assess the amount of body fat in a person. It is defined as a person's weight in kilograms divided by the square of the person's height in meters ( $\text{kg}/\text{m}^2$ )<sup>4</sup>. Starting at 25.0, higher the BMI, greater is the risk of developing obesity-related health problems<sup>5</sup>. These ranges of BMI are used to describe levels of risk<sup>5</sup>:

Overweight (not obese), if BMI is 25.0 to 29.9

Class 1 (low-risk) obesity, if BMI is 30.0 to 34.9

Class 2 (moderate-risk) obesity, if BMI is 35.0 to 39.9

Class 3 (high-risk) obesity, if BMI is equal to or greater than 40.0<sup>5</sup>

Obesity is accused of catalyzing systemic conditions like diabetes mellitus and hypertension and mental illnesses such as depression and anxiety<sup>3</sup>. A reciprocal relationship between obesity and depression has been established with numerous studies<sup>6,7</sup>.

Depression (major depressive disorder) is a common and serious medical illness, which negatively affects how a person feels, how he thinks and acts<sup>8</sup>. Depression can be difficult to tolerate as the subject constantly feels low, tired, hopeless, despaired, trapped, and desperately alone. When depression is at its worst, the prospect of suicide seems the only way to get rid of the pain<sup>9</sup>. The subject fails to realize that there are ways of getting out of depression and obesity with a little medical help.

Exercising has been proven to effectively combat depression<sup>10-15</sup>. When one exercises, endorphins are released in the body which are considered as endogenous opioids<sup>16</sup>. Increased levels of endorphins are associated with numerous physiological and psychological changes in one's body. Mood state changes occur which include triggered positive feelings, exercise euphoria, diminished perception of pain, and fatigue<sup>16</sup>. Thus, improving overall well being of subjects.

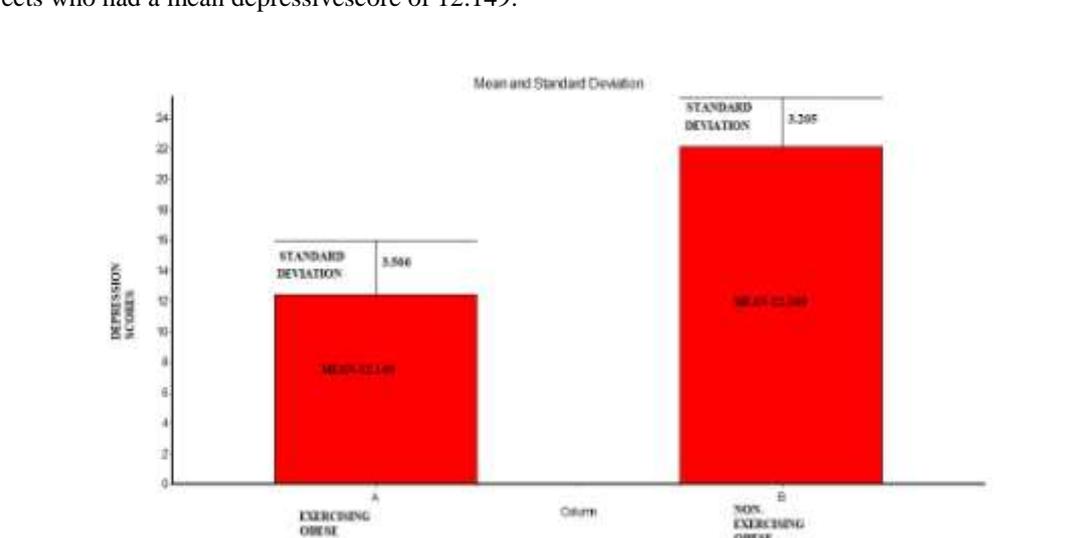
As positive influence of exercise on depression specifically in obese subjects has received far less attention, the current study aims to find out prevalence of depression using Major Depressive Index in non-exercising obese, and exercising obese over a period of 6 months.

## II. METHODOLOGY

This is an observational study which was conducted in a tertiary health center. Thirty non-exercising and thirty exercising obese subjects over a period of six months were selected for this study. Both male and female obese subjects having BMI greater than 30, from 20 to 30 years of age were included. Subjects with academic or financial stress, having used anti-depressant drugs, or having undergone a bariatric surgery were excluded. To exclude academic and financial stress, Student Stress Inventory was used<sup>17</sup>. A written consent regarding the participation in the study was obtained from all the subjects. Major Depressive Inventory is a self-report mood questionnaire developed by WHO to measure levels of depression<sup>18,19</sup>. It consisted of ten questions, which assessed the mood, levels of fatigue, self-confidence, loss of interest in activities which were previously enjoyed, reduced/increased appetite with scores ranging from 0 to 5 (lowest to highest). The subjects were expected to answer the questionnaire to the best of their knowledge. The assessment was conducted in a quiet and distraction free area. The scores were analyzed statistically.

## III. RESULTS

The data, thus obtained from thirty non-exercising obese and thirty exercising obese (N=60) were analysed. The mean of scores indicating depression among non-exercising and exercising obese were calculated and presented graphically. Mann-Whitney test was used for intergroup comparison, where data did not pass the normality test. One tail P value = <0.0001 indicates that it is extremely significant. From the collected data, non-exercising subjects showed higher depressive scores with a mean of 22.169 when compared to exercising obese subjects who had a mean depressive score of 12.149.



## IV. DISCUSSION

The study aimed at quantifying levels of depression in non-exercising vs exercising obese subjects. The study was undertaken due to-

1. Lack of researches quantifying depression, specifically in adolescent obese subjects who have been exercising over a duration of six months with the non-exercising subjects
2. To create awareness regarding presence of mild to moderate depression levels in obese population, and
3. To prove that exercise can be used as potential psycho-somatic treatment for mild-moderate depression in obese individuals.

Obese subjects undergoing any kind of exercise regime over a period of six months were made to answer the Major Depressive Index scale, consisting of ten questions with scores ranging from 0-5 (lowest to highest). The scores for each question were compared among the non-exercising and exercising obese subjects. Mild to moderate levels of depression (20-30 score on MDI) were found in non-exercising obese subjects. Also according to the statistical analysis, non-exercising obese had a higher score (mean=22.169) compared to exercising (mean=12.149) and  $p < 0.0001$  which implies undertaken comparison to be extremely significant.

**Exercising obese subjects were found to have lower scores due to following hypothesized reasons<sup>12</sup>:**

- 1) Exercises have both protective and therapeutic effect on depression, but the mechanism is not clearly understood. It has been reported that the effect of exercise in the modulation of depression may be dependent on neurophysiological, neurodevelopmental, and psychological factors<sup>12</sup>.
- 2) Protective effects of exercises against stress have been focused on hippocampus with potential mediators such as exercise induced neurogenesis, and other suggested mechanism in HPA axis regulate the stress response and activity alterations in serotonergic neurons within dorsal raphe nucleus, thus playing a mediating role in learned helplessness<sup>12</sup>.
- 3) Exercises enhance synaptic plasticity by affecting synaptic structure, potentiating synaptic strength, strengthening underlying system supporting neurogenesis, and metabolism and vascular functions<sup>12</sup>.
- 4) Exercises increase levels of peripheral norepinephrine, endo-cannabinoids, and endorphins which acts like analgesics and reduce levels of mediators like TNF-alpha, IL-6 etc<sup>12</sup>.

It might be difficult to motivate depressed patients to exercise therefore, group exercise or a supervised exercise program with focus on recreational activities is encouraged.

## V. CONCLUSION

The current study quantified depression in non-exercising vs exercising obese subjects, which exhibited a positive influence of exercises on depression, hence encouraging the use of well-planned exercise programmes, specifying the intensity, type, duration, and frequency as a mode of treatment for the same. We are noticing a rapid rise in number of obese individuals in the modern world. This study encourages medical professionals to search for signs of depression in obese individuals as it is inconspicuous and can prove to be a major hindrance on their road to optimal fitness.

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