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The Correlation Between Obesity, Food Addiction, Anxiety & Depression

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Abstract

Obesity is a multifaceted disease with physiological, psychological and social influences. While physiological factors, such as basal metabolic rate, can influence an individual's BMI (Body Mass Index), obesity is primarily determined by behavior: excess food intake and a sedentary lifestyle greatly contribute to weight gain. An individual's behavior is influenced by many factors, including their desires, perceptions, and social pressures. Therefore, psychological conditions can greatly impact an individual's eating habits, thereby affecting that person's BMI. This endeavor involved exploration of the potential effects of food addiction, anxiety, and depression on obesity. A survey consisting of an amalgamation of the Yale Food Addiction Scale (YFAS), Patient Health Questionnaire-9 (PHQ-9) and Hamilton Anxiety Rating Scale (HAM-A) was utilized, enabling objective assessment of the presence of food addiction, depression, or anxiety in patients, respectively. Patients were approached either in one of four Rowan SOM Family Medicine offices, or via online survey posted on social media sites. Data was collected anonymously with no patient identifiers. Analysis of data revealed a significant correlation between obesity and depression, anxiety, and multiple criteria for food addiction.

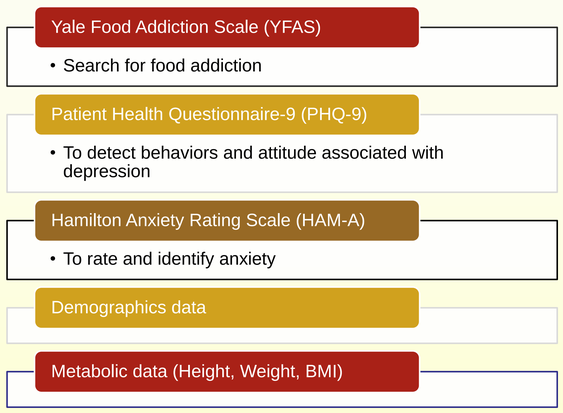
Introduction

- Obesity is associated with negative social and physiological ramifications:
  - Social ridicule
  - Unhappiness, especially with one's self-image
  - Increased risk for cardiovascular disease
- Significant psychological drives are associated with obesity, and the continuous, cyclic consumption of food, which may resemble addiction.
- Evidence of a relationship between addictive behavior, in regard to food consumption, and depression has been discovered [1, 2, 5, 7].
- According to Davis et al[2], obese individuals suffering from food addiction registered greater levels of depression, binge eating, and ADHD when compared to control obese individuals.
- Research into the prefrontal cortical regions of the brain, which modulate addictive behavior, has shown a strong correlation between obesity, and activation of those same regions[1].
- In this experiment, the strength of the correlation between obesity and addictive behavior will be further discovered, and the prevalence of depression and anxiety among obese individuals who suffer from food addiction will be observed.

Materials and Methods

Survey Design

- Participants were initially given a consent form, detailing the project and providing them with the option to participate or to decline.



Screening and Recruitment

- Recruitment lasted June 12th – July 27th, 2018.
- Participants were older than 18 years old.
- Patients were approached from the following Rowan School of Osteopathic Medicine Family Medicine clinical offices in New Jersey: Stratford, Hammonton, Mount Laurel, and Washington Township.
- Surveys were completed using the following methods
  - Survey provided on a laptop
  - QR Code
  - Website Link: distributed on paper and online (Reddit & Facebook)
- One hundred and sixty patients were approached in person, with 111 of them being enrolled into the experiment. Another 136 individuals were enrolled from links provided online.

Data Analysis

- Using SPSS Statistics, a bivariate Pearson Correlation Coefficient was calculated in order to determine predictive relationships between BMI and the following variables: PHQ-9 scores, YFAS substance dependence criterion, HAM-A scores, and biological sex.
- Dummy variables were generated for ordinal values such as age, which was presented as a series of ranges, thereby enabling the determination of a bivariate correlation between these values and the ones being tested in this experiment (BMI, PHQ-9 score, YFAS score, HAM-A score).

Results

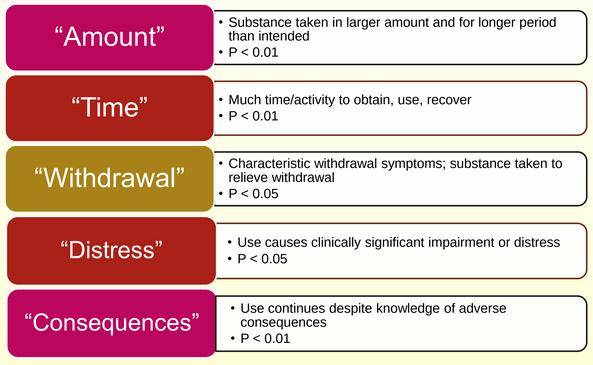
Effect of BMI on Anxiety and Depression

- There was a significant effect of BMI on depression in surveyed patients ($P < 0.05$); increasing BMI scores correlated significantly and proportionately with PHQ-9 scores (Figure 1).
- There was a significant effect of BMI on anxiety in surveyed patients ($P < 0.05$); increasing BMI scores correlated significantly and proportionately with HAM-A scores (Figure 2).

Results (continued)

Relation between BMI and Food Addiction

- A positive, but insignificant, correlation was found between BMI and overall YFAS score ($P = 0.690$).
- A significant correlation was found between BMI and the following criteria for substance abuse, as defined by the Yale Food Addiction Scale, and the DSM-IV (Figure 3):



- No significant correlation was found between BMI and the following criteria for substance abuse (Figure 3):

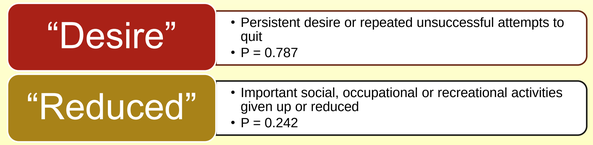


Figure 1. Depression (PHQ-9 score) is directly correlated with Obesity (BMI) ($P < 0.05$); patients with greater BMI scores had greater PHQ-9 scores.

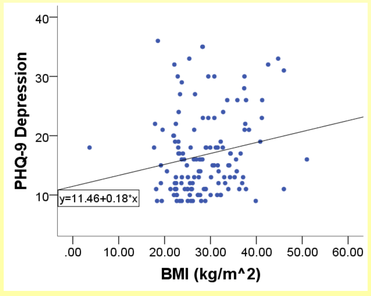
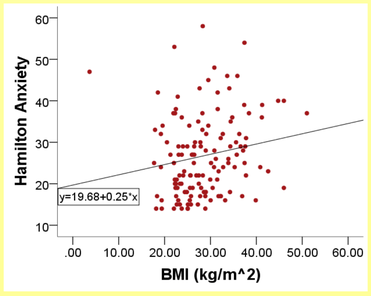
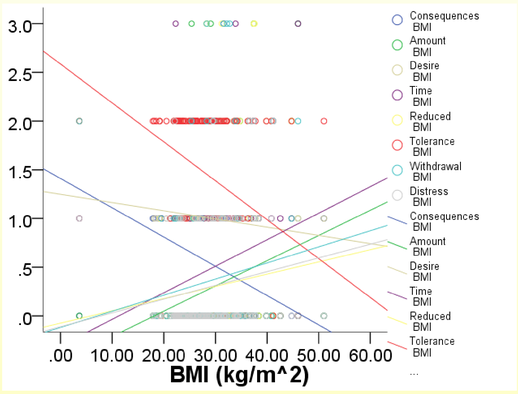


Figure 2. Anxiety (HAM-A score) is directly correlated with Obesity (BMI) ($P < 0.05$); patients with greater BMI scores had greater HAM-A scores.



Results (continued)

Figure 3. Correlations between BMI and criteria for substance abuse as defined by the YFAS and the DSM-IV. Significant positive correlations were found between BMI and the following substance abuse criteria: "Amount" ($P < 0.01$), "Time" ($P < 0.01$), "Withdrawal" ($P < 0.05$), and "Distress" ($P < 0.05$). Significant negative correlations were found between BMI and the following substance abuse criteria: "Tolerance" ($P < 0.01$) and "Consequences" ($P < 0.01$).



Discussion

- Obesity correlates directly with anxiety and depression. Other studies reported similar findings, with Strine et al. discovering that individuals diagnosed with anxiety or depression at any point in their lives were more likely to be obese (as defined by a BMI ≥ 30)[9]. They also discovered a significant correlation between depression and other detrimental behaviors, including smoking and alcohol use.
- Further research into the effects of psychological conditions, such as depression and anxiety, on lifestyle choices and behaviors is warranted, so as to further unravel any other correlations that may be found.
- Obesity correlates directly with 6 of 8 YFAS substance abuse criteria, but does not correlate significantly with overall YFAS score. Previous research has shown a significant positive correlation between food addiction, as measured by the YFAS, and obesity[3].
- Further studies with a larger sample size are needed to determine the presence of a significant relationship between BMI and YFAS score, since significant correlations with substance abuse criteria indicate the presence of a direct relationship with YFAS score that may be uncovered.

Acknowledgements

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