

# Obesity and Mental Illness: A Bidirectional Pathogenesis!

## Introduction

The surgeon general of the USA released in 2010 “A vision for a healthy and fit nation” and reported that the prevalence of obesity changed relatively little during the 1960s and 1970s, but it increased sharply over the ensuing decades-from 13.4% in 1980 to 34.3% in 2008 among adults and from 5% to 17% among children during the same period. The prevalence of extreme obesity also increased during 1976-1980 and 2007-2008, and approximately 6% of U.S. adults now have a BMI of 40 kg/m<sup>2</sup> or higher [1]. Obesity poses a major public health challenge. Each year, obesity contributes to an estimated 112,000 preventable deaths [2].

The obesity problem became an independent and major risk health factor in the past thirty to forty years. The gravity of this issue is reflected in the amount of research and published literature in the same period of time. A simple search containing the word obesity yielded more than sixty six million entries.

Review Article

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We were interested in the bidirectional relationship of obesity and mental illness so a literature search showed more than twelve million entries. Those findings only underscore the magnitude of the problem and its universality (Figure 1 & 2).

Adult BMI Classification	Children BMI Classification
<b>Underweight</b> ≤ 18.5	<b>Underweight</b> ≤ 5 <sup>th</sup> percentile
<b>Healthy Weight</b> 18.5-24.9	<b>Healthy Weight</b> 5 <sup>th</sup> to the 85 <sup>th</sup> percentile
<b>Overweight</b> 25-29.9	<b>Overweight</b> 85 <sup>th</sup> to the 95 <sup>th</sup> percentile
<b>Obese</b> ≥ 30	<b>Obese</b> ≥ 95 <sup>th</sup> percentile
*BMI for Age Percentile [Age 2-19]	

**Figure 1:** Adult BMI Classification.

**Figure 2:** Children BMI Classification.

## Literature review

We conducted a limited review of the recent literature in regard to the implications of obesity on mental illness and vice versa as Dr. Sharma stated in 2007 “Obesity is a heterogeneous complex disorder of multiple etiologies characterized by excess body fat that threatens or affects socioeconomic, mental or physical health” [3] for Rarely we do find a comorbidity in mental health as prevalent as OBESITY. From Victims of sexual abuse to schizophrenia, Obesity remains the most consistent and detrimental companion. We will encounter the consequences of obesity in Mood Disorder, Anxiety Disorder, Attention Deficit Disorder, Sleep Disorder, Personality Disorder, Addiction Disorder, Psychotic Disorder and Cognitive Disorder [4].

A biological basis of the reward system that is hyper-responsive to food/taste cues is consistent with the incentive-sensitization hypothesis in addiction that posits that addiction-related cues stimulate and eventually hijack reward neuro-circuitry. F-MRI demonstrates that the striatum (particularly the ventral component including the nucleus accumbens) signals

reward anticipation [5,6]. The psychological implication of obesity precipitating and contributing to mental illness is found repeatedly as criteria related to the diagnosis of numerous mental illnesses.

Simon et Al found that Obesity is associated with an approximately 25% increase in odds of mood and anxiety disorders [7], BMI ( Body Mass Index), or weight status, were associated with the probability of past-year major depression, suicide attempts, and suicide ideation [8] that finding reflects the comorbidity and high mortality related to obesity. Furthermore, when looked at the comorbidity of mental illness in a cohort presenting to bariatric surgery, a lifetime prevalence rates of Axis 1 psychiatric disorders range up to 50%; and 47.7% were using at least 1 psychotropic medication. 20% of patients may be considered psychologically inappropriate for immediate surgery [9]; recently November 14,2015 at the APM yearly conference in New Orleans researchers announce despite the above finding the presence of mental illness does not and should not exclude any candidate from getting a suitable bariatric solution to their obesity

problem because the risk inherent to obesity supersedes the risk of the mental illness decomposition in post-surgical intervention; they called for more close monitoring and early intervention.

The childhood obesity represents a lifelong risk and predictor of impending mental illness of all kind. A meta-analysis of Forty-two studies that included a total of 728,136 individuals (48,161 ADHD subjects; 679,975 comparison subjects) were retained. A significant association between obesity and ADHD was found for both children (odds ratio=1.20, 95% CI=1.05–1.37) and adults (odds ratio=1.55, 95% CI=1.32–1.81). The pooled prevalence of obesity was increased by about 70% [10].

Pine et al studied children 6 to 17 years old with major depression (n=90) or no psychiatric disorder (n=87). Children were followed up 10 to 15 years later, Psychiatric status was evaluated at both intake and follow-up then BMI was recorded in adulthood. The Participants with major depression had a BMI of 26.1 +/- 5.2 as adults while those without depression had a BMI of 24.2 +/- 4.1 [11].

### A mind-body Interaction

Obesity is also frequently accompanied by depression and the two can trigger and influence each other. Although women are slightly more at risk for having an unhealthy BMI than men, they are much more vulnerable to the obesity-depression cycle. In one study, obesity in women was associated with a 37 percent increase in major depression. There is also a strong relationship between women with a high BMI and more frequent thoughts of suicide.

Depression can both cause and result from stress, which, in turn, may cause you to change your eating and activity habits. Many people who have difficulty recovering from sudden or emotionally draining events (e.g., loss of a close friend or family member, relationship difficulties, losing a job or facing a serious medical problem) unknowingly begin eating too much of the wrong foods or forgoing exercise. Before long, these become habits and difficult to change. ([www.apa.org/helpcenter/obesity.aspx](http://www.apa.org/helpcenter/obesity.aspx)).

Binge eating, a behavior associated with both obesity and other conditions such as anorexia nervosa, is also a symptom of depression. A study of obese people with binge eating problems found that 51 percent also had a history of major depression. Additional research shows that obese women with binge-eating disorder who experienced teasing about their appearance later developed body dissatisfaction and depression.

This linear bidirectional pathogenesis is a lifelong threat to the physical and the mental health of the afflicted individual and thus entails a great amount of biopsychosocial disadvantage reflecting in a longitudinal poorer Quality of life in general and diminished Health related quality of life.

“Linear-regression analyses revealed that higher BMI, higher age, and higher numbers of current somatic and mental disorders negatively predicted the physical dimension of HRQL (Health Related Quality of Life). Higher numbers of both mental and somatic disorders as well as female gender and younger age seemed to be independent negative predictors of mental HRQL” [12].

### Causes and Consequences of Obesity

While recognizing that consuming too many calories and not getting enough physical activity is about the major player in precipitating obesity; there are genes, metabolism, behavior, environment, and culture factors that can also play a role in causing people to be overweight and obese. As we may see in Qatar, which is one of the tubbiest nations in the world.

About 75 percent of Qataris are overweight and 40 percent are obese or morbidly obese, according to the latest figures from the National Health Strategy 2011-2016.

To combat obesity we need to determine the modifiable risk factors and implement the necessary measures to reach the health outcome. A balance in the intake and output of daily calories is the most efficacious intervention so far. When the amount of calories consumed surpasses our daily energy expenditure the positive balance translates itself in accumulation of fat tissue leading to overweight then obesity, while a negative balance leads to loss of fat tissue and a direct proportional reduction in weight; thus modifying the quantity and quality of food seems to be the most efficacious way in weight loss, yet the healthier way would entail the addition of increasing the physical activity and decreasing the sedentary life style. Physical activity seems to be the most efficacious way in controlling the weight and preventing numerous physical and psychological diseases [13]. A healthy begins early on with breast feeding that has been proven to decrease the BMI in later years [14].

Other important healthy choices includes [15-17]:

- (a) Reducing consumption of sodas and juices with added sugars.
- (b) Reducing consumption of energy dense foods that primarily contain added sugars or solid fats.
- (c) Eating more fruits, vegetables, whole grains, and lean proteins.
- (d) Controlling your portions.
- (e) Drinking more water.
- (f) Choosing low-fat or non-fat dairy products.
- (g) Limiting television viewing time and consider keeping televisions out of children’s rooms.
- (h) Becoming more physically active throughout the day.
- (i) Breastfeeding exclusively to 6 months.

Otherwise, the obese person would be a candidate to:

Symptoms of Psychological Distress [18] as cited by the American Psychological Association in its Resolution on the Promotion of Healthy Active Lifestyles and Prevention of Obesity and Unhealthy Weight Control Behaviors in Children and Youth in February 2009.

They are more likely to experience symptoms of psychological and social distress due to the stigma of being overweight or obese, including:

- (i) Social isolation
- (ii) Behavioral difficulties
- (iii) Negative self-view
- (iv) Low self-esteem
- (v) Depression
- (vi) Suicide

Weight bias may lead to bullying and victimization by peers of any age group especially in children where it has even been associated with teachers and school staff attributing less desirable personality characteristics to obese youth and their families.

### Recommendations

In addition to the guidelines mentioned above as it was recommended by the Surgeon General of the USA in 2010; we do recommend, from a psychiatric and psychological stance, the implementation of behavioral treatment of obesity that refers to a set of principles and techniques designed to help overweight individuals reverse the above-described maladaptive eating and activity habits [19], in particular CBT (Cognitive Behavioral Therapy) was by far more efficacious in treating and supporting a healthy maintenance of BMI as well as re adjusting the negative feelings that the obese persons were experiencing toward themselves and the society at large; CBT treated subjects showed significant improvement in body image. Psychological symptoms, self-esteem, overeating, and eating guilt also improved. Weight was unchanged for most subjects and unrelated to treatment outcome overall [20]. This issue is of high importance for public health because if the current trends continue, 1/3 of individuals born in the year 2000 will develop diabetes in their lifetime [21].

### Conclusion

Obesity and Mental illness each one alone predisposes and associated with MET-s (Metabolic Syndrome).

Mental illness and obesity have a bidirectional linear correlation leading to the severity and poorer outcome if not adequately addressed.

The cascade of decision making process regarding the diagnosis, the treatment and the follow up planning that we are following is based on the "The BIO-PSYCHO-SOCIAL" model in evaluating the complexity of any pathological presentation including Obesity.

Both illnesses (obesity and Mental Illness) are manageable / treatable most effectively by a multi-disciplinary team: Psychiatry/ Psychology, medical (endocrinology), dietary consultant, physical activity coaching and surgical approach.

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