Annals of Clinical Psychiatry, 18[4]:239–241, 2006

ISSN: 1040-1237 print / 1547-3325 online
DOI: 10.1080/10401230600948423

informa
healthcare

Weight Gain Occurs After Onset of Bipolar Illness in Overweight Bipolar Patients

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Background. *Bipolar patients appear to have a risk of weight gain and obesity higher than the general population. This has traditionally been attributed to medication and disease variables, but there have not been any studies that have investigated this directly.*

Methods. *We examined 32 consecutive bipolar subjects and 32 matched controls for weight, BMI, fat content, and historic weight at age 18.*

Results*. Bipolar patients were heavier (193.1 ± 55.6 vs. 165.6 ± 37.8 lbs., P = 0.03), with greater BMI (30.3 ± 8.8 vs. 24.3 ± 4.0, P = 0.001), and higher fat content (33.3 ± 9.9 vs. 19.1 ± 9.9%, P < 0.0001) than psychiatrically well controls. A larger fraction of bipolar subjects were obese (BMI > 30, 50% vs. 9.7%, z = 3.88, P < 0.01). However, weight at age 18 was not statistically different (143.0 ± 35.8 for bipolar subjects vs. 152.8 ± 42.7 lbs., P = 0.3).*

Conclusions*. This is the first controlled study examining weight gain in bipolar illness and the first demonstration that premorbid weight is in the normal range for bipolar subjects. Subsequent weight gain is probably related to illness and treatment variables.*

Keywords Bipolar, Weight gain, Obesity, BMI

INTRODUCTION

Bipolar disorder has been associated with rates of excessive weight and obesity that exceed the general population (1–4). Specifically, the rates of obesity in bipolar samples generally exceed 35% (1–3) while in the general population the rate is closer to 22% (4) and 30% in nonpsychiatric clinical samples (5). This results in a consequent increase in *both* medical and psychiatric morbidity (2,6). Obese bipolar subjects are more likely to relapse than non-obese bipolar subjects (3). Additionally, bipolar patients have a higher than general population risk for hypertension, stroke, and congestive heart failure (4,6).

Psychopharmacotherapy has generally been seen as the major culprit for the weight gain in bipolar patients (7). However, with the exception of a few agents (e.g., olanzapine [8]), this has not been objectively demonstrated. At issue is whether early weight gain and bipolar illness have a more intimate pathophysiologic relationship as may be the case in unipolar depression (e.g., in which obesity is thought to lead to or worsen depression in adolescents [9]). Consequently, we undertook a controlled study to determine if weight gain proceeds or follows the bipolar diagnosis.

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METHODS

Thirty-two consecutive bipolar patients attending a bipolar clinic and 32 matched psychiatrically well controls recruited by word-of-mouth advertising were included in the study. The bipolar subjects suffered from type I (n = 25), or type II (n = 7) bipolar illness. Diagnosis was clinical, based on the DSM-IV criteria, not confirmed by structured diagnostic interview. The controls were students, employees, and their family members who heard about the study through someone they know and who denied psychiatric history upon questioning in private setting. This is not the best control group, which ideally would have been a group of non-bipolar, psychiatrically ill subjects, or a group of

non-psychiatrically ill, medical clinic subjects. After providing informed consent, information about psychiatric history, medications, and memory of weight at age 18 years of age was obtained. Additionally, body fat content, weight, height, and body mass index (BMI) were measured or calculated. Data were analyzed utilizing ANOVA covaried to match samples, with subsequent Fisher's PLSD. A test for examining proportional criteria was used to assess the relative fractions of obesity and overweight (10). While the sample size is small, all the effect sizes between the groups exceed 2.0, resulting in power of > 0.9 for all the significant comparisons.

RESULTS

The initial sample was not appropriately matched with an excess of female bipolar subjects (75% vs. 34% female controls, $P = 0.005$), and an older bipolar sample (38.7 ± SD 12.06 vs. 31.2 ± 12.05 years, $P = 0.02$). Consequently, the statistics were corrected for the analysis. Mean duration of bipolar illness was 3.7 ± SD 5.4 years, with an average age of onset of 32.0 ± SD 11.0 years. Bipolar subjects were heavier (193.1 ± 55.6 vs. 165.6 ± 37.8 lbs., $P = 0.03$), with greater BMI (30.3 ± 8.8 vs. 24.3 ± 4.0, $P = 0.001$), and higher fat content (33.3 ± 9.9 vs. 19.1 ± 9.9%, $P < 0.0001$). The majority of bipolar subjects were overweight (62.5%, defined as BMI > 25) compared with a much smaller fraction of overweight controls (28.1%, $z = 2.9$, $P < 0.01$). Most of the overweight bipolar subjects were obese (53.1%, defined as BMI > 30), while only a third of overweight controls were obese (9.4%, $z = 4.28$, $P < 0.01$).

Weight at age 18 was not different (143.0 ± 35.8 for bipolar subjects vs. 152.8 ± 42.7 lbs., $P = 0.3$). Five bipolar subjects had onset of illness before age 18, but their weight was also not significantly different at age 18 from the entire control sample (177.5 ± 51.4 vs. 151.8 ± 42.4 lbs., $P = 0.3$). While this last analysis lacked sufficient power, overall there was adequate power in this sample (0.71).

DISCUSSION

Adult bipolar patients have a higher risk for obesity, but this does not appear to begin in adolescence and does not appear to predate the psychiatric illness. It appears likely that variables associated with the illness, or its treatment, are more likely to be responsible to the increased risk of excessive weight gain. These may include illness variables such as depression, which tends to be more atypical in bipolar subjects with increased appetite and increased weight (11) and which occupies one third to one half of a bipolar's life time (12,13). Alternatively, available treatment options may increase carbohydrate craving and weight gain (3,8,14). Addressing these issues is important to reduce overall morbidity in bipolar patients.

This is the first controlled study of weight issues in bipolar disorder. Controls are important because there are regional differences in weight and eating habits. For example, the fraction of overweight controls of 28.1% exceeds the national averages, but is expected for Kentucky (15), where this study was performed. Furthermore, this is the first demonstration that premorbid weight of bipolar patients does not vary from nonpsychiatric controls, providing support for the conclusion that illness or treatment variables are responsible for weight gain.

Nonetheless, this study has some limitations. Premorbid weight information was obtained retrospectively, introducing a potential bias. Furthermore, although we corrected for the imbalance in age and gender in our statistical analysis, the initial sample was not appropriately matched. While these problems may be a cause for caution in the interpretation of the study, it is believed that they were adequately addressed.

In summary, weight gain in bipolar illness does not appear to predate the onset of the psychiatric illness and may be associated with either illness or treatment variables.

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