Practitioner's Corner

Obesity and Medical Illnesses in Psychiatric Patients Admitted to a Long-term Psychiatric Facility

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Obesity and associated medical conditions may have an impact on morbidity and even mortality in patients with psychiatric disorders. The authors present the results of a survey of the prevalence of obesity and selected medical conditions among 420 consecutively admitted psychiatric inpatients at a long-stay facility and compare these data with those reported in the literature.

Female psychiatric subjects had considerably higher rates of being either overweight or obese (69%) as compared to women in the general U.S. population (51%). Male psychiatric subjects did not differ significantly from their counterparts in the general population in being overweight or obese (nearly 55%). The majority of psychiatric subjects with essential hypertension, diabetes mellitus, dyslipidemias, cardiovascular disease, or sleep apnea were either overweight or obese (72%–87%). In this cross-sectional study, no associations could be deduced between psychotropic drug classes and specific medical conditions. No specific psychiatric diagnostic category was associated with a significantly greater prevalence of any specific medical condition, except that subjects with schizoaffective disorder appeared to have a higher prevalence of type II diabetes mellitus (11.6%). Subjects with predominant substance or alcohol abuse or dependence disorders had a lower prevalence of obesity and associated medical conditions.

Obesity—either independently or additively along with a sedentary lifestyle, unhealthy dietary habits, and nicotine dependence—may have a serious impact on coexisting medical comorbidity in psychiatric patients. Judicious monitoring for obesity and rapid pharmacological and nonpharmacological intervention, where appropriate, by concerned clinicians may improve several coexisting medical conditions in psychiatric patients and thereby improve patients' overall quality of life. *(Journal of Psychiatric Practice* **2001;7:432–439**)

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In studies of psychiatric inpatients or outpatients, comorbid medical conditions have been noted in 42%–56% of the subjects.[1–4] The occurrence of medical comorbidity among subjects with different psychiatric diagnoses appears to vary. For instance, patients with major depression had higher rates of medical comorbidity compared to patients with schizophrenia.[5] Elderly psychiatric patients, especially those suffering from organic brain syndromes,[6] were also reported to have a higher prevalence of comorbid medical conditions.[5–7] Despite the magnitude of such comorbidity, medical conditions tend to be underreported, underrecognized, and thus undertreated among psychiatric patients.[6–11]

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Medical conditions associated with obesity have drawn considerable attention in psychiatry. Various psychotropic drugs may by themselves induce weight gain and, in some subjects, substantial weight gain may occur in a short period of time. The emotional turmoil associated with psychiatric disorders and the consequent impact on

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Table 1. Demography of the study cohort

	All Patients $N = 420$	Schizophrenia $n = 143$ (34%)	Schizoaffective disorder $n = 93$ (22%)	Major depression $n = 43$ (10%)	Bipolar disorder $n = 67$ (16%)	Other $n = 74$ (18%)
Gender (%)						
Male	64.0	72.4	53.7	64.4	58.0	73.7
Female	36.0	27.6	46.3	35.6	42.0	26.3
Age (years)						
Mean ± SD	40 ± 13	41 ± 13	41 ± 10	41 ± 13	42 ± 12	37 ± 15
Race (%)						
Caucasian	65.7	54.5	64.2	73.3	76.8	68.4
African American	33.1	45.5	34.7	22.2	21.7	30.3
Other	1.2	—	1.1	4.4	1.4	1.3

diet and appetite may also induce weight changes. Weight gain or loss is also a neurovegetative sign associated with certain affective disorders. There are reports that some medical conditions related to obesity (e.g., diabetes mellitus) are more prevalent among patients with certain psychiatric diagnoses as compared to the general population.[11–13]

In this article, we report on an investigation of the frequency of a group of medical conditions associated with being overweight or obese among psychiatric patients admitted to a long-stay state psychiatric facility during a 1-year period (1998). The medical conditions we looked at included diabetes mellitus (Type II), essential hypertension, dyslipidemia, cardiovascular disease, and sleep apnea. Because we did not have normative data on these medical conditions for the general population specifically matched for age, gender, and socioeconomic status to the subjects with various psychiatric diagnoses, we compared the prevalence of these medical conditions among psychiatric patients with the rates reported in the literature for the general U.S. population.

METHODS

The study was approved by the Institutional Review Board of the University of Pittsburgh and also by the Mayview State Hospital Research Review Board and the Office of Mental Health and Substance Abuse Services of the Commonwealth of Pennsylvania.

We reviewed the medical records of 420 psychiatric patients who were consecutively admitted to the adult psychiatric services at Mayview State Hospital (a long-stay facility) in the year 1998 and who were either resident or discharged by December 1999. A detailed evaluation was performed for all patients on admission. Patients were diagnosed by an attending psychiatrist using DSM-IV criteria,[14] with the psychiatric examination and diagnosis dictated by the psychiatrist. Medical history and physical examination were dictated by an internist. Demographic data, medical history, DSM-IV psychiatric diagnosis, and findings from the physical examination at admission as well as admission weight and body mass index (BMI) were either obtained or calculated from the patients' charts for the purposes of this study.

Mayview State Hospital provides inpatient psychiatric services to individuals resident in the greater Pittsburgh metropolitan area and surrounding counties. There are no direct admissions to the civilian side of this nearly 450 bed facility; rather, all subjects are admitted after having spent an average of 3–4 weeks in area community hospitals receiving psychiatric treatment but either failing to improve or needing further inpatient care to stabilize their illness. The average length of stay for those subjects admitted to the State Hospital in 1998 was 104 days.

For the analyses presented in this article, the patients' psychiatric diagnoses were grouped into five main DSM-IV categories: schizophrenia, schizoaffective disorder, major depression, bipolar I disorder, and all other psychiatric diagnoses.

Patients' records were evaluated for the following medical conditions:

- Obesity defined as BMI $\geqslant 30$[15]
- Being overweight defined as $25 \leqslant$ BMI < 30[15]
- Normal weight defined as $18 \leqslant$ BMI < 25[15]
- Diabetes mellitus, Type II (in all cases in this sample, defined as a fasting blood glucose > 140 mg/dl on two occasions or a 2 hour postprandial blood glucose $\geqslant 200$ mg/dl; subjects with diabetes mellitus had already been diagnosed and were all receiving dietary and/or pharmacological treatment for glucose control). The newer definitions proposed in the year 2000 by the American Diabetes Association were not used because the data in the study were collected before these new guidelines were introduced.[16]

Table 2. Gender, ethnicity, age, and their associations with certain medical conditions

	Gender		Age	Race	
	Male n = 265 %	Female n = 149 %	Mean ± SD n = 272 years	Caucasian n = 137 %	African American %
Hypertension	13.7	18.7	47 ± 12	13.9	17.4
Diabetes mellitus	6.2	9.4	49 ± 11	6.8	8.6
Dyslipidemia	10.3	12.4	44 ± 12	11.2	10.7
Sleep apnea	0.4	3.4	45 ± 12	2.2	0.0
Cardiovascular disease	4.4	2.7	57 ± 16	4.7	2.2
Overweight	32.8	30.9	40 ± 11	33.1	29.9
Obesity	21.9	38.2	41 ± 11	28.7	27.0

- Essential hypertension (defined as a sustained [two or more readings] systolic blood pressure > 140 mm Hg or diastolic blood pressure > 90 mm Hg, or normotensive with the use of antihypertensive treatment)
- Dyslipidemia (defined as a fasting blood cholesterol ⩾ 200 mg/dl or triglycerides ⩾ 200 mg/dl)
- Obstructive sleep apnea (diagnosed by overnight polysomnography and oxyhemoglobin desaturation).
- Cardiovascular diseases (including coronary heart disease but excluding congenital and rheumatic heart diseases)

Statistical analyses for categorical data were done using the chi-square test. Data involving continuous variables were analyzed using analysis of variance.

RESULTS

Table 1 shows the demographic data for the overall study cohort and for each of the five psychiatric diagnostic categories. There were more men (64%) than women (36%) and the average age was 40 years; nearly two thirds of the cohort were Caucasian and one third were African-American. Thirty-four percent of the cohort had a DSM-IV diagnosis of schizophrenia, 22% schizoaffective disorder, 10% major depressive disorder (MDD), and 16% bipolar illness, while 18% had other Axis I psychiatric diagnoses, with the majority of those patients (> 90%) diagnosed primarily with substance and/or alcohol abuse or dependence.

Association between Gender, Ethnicity, and Age and Selected Medical Conditions

Table 2 presents percentages of patients with the selected medical conditions broken down according to gender, age, and race. Sleep apnea was diagnosed mainly in females (5/6) and was noted among Caucasians only. Cardiovascular disease also appeared to be diagnosed mainly in Caucasian patients (13/16) compared with African-American patients. However, it is pertinent that the number of subjects in the sleep apnea and cardiovascular diseases categories was small.

Within the study population, there was no statistically significant difference in mean age among those who were either overweight or obese compared with those who had a normal BMI. However, the mean age of patients diagnosed with essential hypertension, diabetes mellitus, or cardiovascular disease was greater than that of patients who did not have these medical conditions. Thus, mean ± SD ages for patients having these conditions versus those not having them were 47 ± 12 years versus 39 ± 12 years (Anova: F = 28.9, df = 1, $p < 0.0001$) for hypertension, 49 ± 11 years versus 40 ± 12 years (Anova: F = 18.12, df = 1, $p < 0.0001$) for type II diabetes mellitus, and 57 ± 16 years versus 40 ± 12 years (Anova: F = 32, df = 1, $p < 0.0001$) for cardiovascular diseases. Patients with sleep apnea (45 ± 12 years versus 40 ± 13 years) and those with dyslipidemia (44 ± 12 years versus 40 ± 13 years) were also older than patients not having either of these conditions; however, the differences were not statistically significant.

Association between Selected Medical Conditions and BMI in This Study and in the General Population

Table 3 presents the percentages of patients with the selected medical conditions in association with different BMIs and compares these results with those in the general population. Just as in the general population, the majority of psychiatric patients (approximately 72%–87%) who had either essential hypertension, diabetes mellitus (type II), dyslipidemia, cardiovascular disease, or sleep apnea were either overweight or obese. Psychiatric patients with dyslipidemia or essential

Table 3. BMI distribution across medical conditions in the present study and that reported in the general population*

	Study Population					General Population
	n	Normal BMI %	Overweight %	Obese %	Combined overweight and obese %	Combined overweight and obese %
Diabetes mellitus	30	13.3	30	56.7	86.7	90[17]
Essential hypertension	61	23.0	29.5	47.5	77.0	57 men 61 women[18]
Dyslipidemia	46	17.4	39.1	43.5	82.6	40 men 53 women[19]
Sleep apnea	6	16.7	0	83.3	83.3	Increased risk[20]
Cardiovascular disease	16	28.6	28.6	42.9	71.5	57–70[21]

BMI = body mass index: normal weight 18 ⩽ BMI < 25; overweight 25 ⩽ BMI < 30; obese BMI ⩾ 30.

hypertension were more likely to be either overweight or obese compared with the general population with these medical conditions. The data for these medical conditions had to be obtained from different sources. Sometimes they were not broken down by gender differences and sometimes specific numbers were unavailable. Also, even though the prevalence of overweight or obesity was higher among women with psychiatric illness than among women in the general population, no diagnostic subgroup was singled out. Interestingly the "other" diagnostic group of mainly women with alcoholism and substance abuse or dependence were in the normal weight category and were similar to the population of women at large.

Nearly 57% of psychiatric patients with diabetes mellitus were obese (compared with 25.5% in the rest of the hospital sample), while only 13.3% had a BMI in the normal range (compared with 42.2% of those without diabetes mellitus, Pearson $\chi^2 = 15.5$, df = 2, $p = 0.0001$). Nearly 48% of psychiatric patients with essential hypertension were obese (compared with 24.4% of those without hypertension), while only 23% had a BMI in the normal range (compared with 43% in those without hypertension, Pearson $\chi^2 = 15.58$, df = 2, $p = 0.0001$). Nearly 44% of psychiatric patients with dyslipidemia were obese (compared with 26% in those without dyslipidemia), whereas 17% had a BMI in the normal range (compared with 43% in those without dyslipidemia, Pearson $\chi^2 = 12.04$, df = 2, $p = 0.002$). Eighty-three percent of patients with sleep apnea were obese (compared with 17% in those without sleep apnea , Pearson $\chi^2 = 9.55$, df = 2, $p = 0.008$). Half (3/6) of the patients suffering from sleep apnea had morbid obesity (BMI ⩾ 40). There were proportionally more obese patients among those diagnosed with cardiovascular disease (43% compared with 27% in those without cardiovascular disease), whereas 29% were within the normal BMI range (compared with 41% for those without cardiovascular disease). However, these numbers did not reach statistical significance.

The Prevalence of Selected Medical Conditions in Different Psychiatric Diagnostic Groups

The prevalence of selected medical conditions in the five psychiatric diagnostic categories is shown in Table 4. There was a trend towards a higher percentage of patients with schizoaffective disorder (11.6%) being diagnosed with diabetes mellitus compared with the rest of the patient sample (6.1%, Pearson $\chi^2 = 3.23$, df = 1, $p = 0.06$). Interestingly, subjects with "other diagnoses" (the majority of them having substance and/or alcohol abuse or dependence) showed a statistical trend toward a lower prevalence of diabetes mellitus compared with the rest of the patient sample (Pearson $\chi^2 = 3.03$, df = 1, $p = 0.06$). The prevalence of essential hypertension was not significantly different across the psychiatric diagnoses. Again, the category of "other psychiatric diagnoses" had a relatively low prevalence rate of hypertension, 6.6%, compared with the rest of the sample (17.1%, Pearson $\chi^2 = 5.31$, df = 1, $p = 0.01$).

The prevalence of dyslipidemia, sleep apnea, and cardiovascular disease in patients with schizophrenia, schizoaffective disorder, major depression, bipolar disorder, and other psychiatric diagnoses is also reported in Table 4. There were no significant differences in the rates of these medical conditions in each of the psychi-

Table 4. Distribution of selected medical conditions across the psychiatric diagnostic groups*

	Study Population					General Adult Population
	Schizophrenia $n = 140$ %	Schizoaffective $n = 91$ %	Major Depressive Disorder $n = 43$ %	Bipolar Disorder $n = 66$ %	Other $n = 73$ %	%
Hypertension	15.9	17.9	20.0	20.3	6.6	< 20[22]
Diabetes mellitus	6.9	11.6	8.9	5.8	2.6	7.8[23]
Dyslipidemia	11.7	10.5	11.1	11.6	7.9	20[24]
Sleep apnea	0.7	3.2	—	2.9	—	4 (men) 2 (women)[20]
Cardiovascular disease	4.8	3.2	4.4	4.3	1.3	8.5 (men) 3.7 (women)[25]

** Data missing in a few patients.*

atric diagnostic categories compared with the rest of the sample.

Odds of Having a Specific Psychiatric Diagnosis and a Specific Comorbid Medical Condition

Odds ratios were calculated for the probability of having both a given psychiatric diagnosis and a specific medical condition in subjects of each gender (Table 5). Despite numeric differences in certain subcategories, none of these odds ratios was statistically significant. This may have been due to the small number of subjects in each subgroup; however, these data are shown for possible interest to the reader.

Cross-sectional Associations Between Psychotropic Drug Use and the Prevalence of Selected Medical Conditions

Essentially, there were no significant differences in the cross-sectional prevalence of specific medical conditions in patients treated with different types of psychotropic medications. Approximately, 40%–70% of patients diagnosed with the five selected medical conditions were treated with mood stabilizers, while nearly 80% were treated with antipsychotic agents; many were receiving multiple psychotropic medications.

DISCUSSION

The prevalence of being overweight or obese has increased in the United States during the last two decades. Specifically, The Third National Health and Nutrition Examination Survey (NHANES III survey), which was conducted between 1988 and 1994, estimated that nearly 33% of adults 20 years and older are overweight ($25 \leq BMI < 30$) and that 22.3% are obese ($BMI \geq 30$)—i.e., that 97 million adults in the U.S. population are overweight or obese.[26] While the NHANES III survey suggests the prevalence of being overweight and or obese in the general population is similar to the rates seen among men in the present study, the rates observed for women with psychiatric illnesses (69%) were elevated compared to the general population.

Obesity is associated with an increased risk for diabetes (type II),[17] essential hypertension,[19, 21, 22] dyslipidemia,[19, 27] sleep apnea,[28, 29] and cardiovascular disease, among other medical conditions. The present data suggest that, just as in the general population, several medical conditions also tend to be associated with being either overweight or obese in psychiatric patients. However, our results suggest that, except for patients with schizoaffective disorder, among whom there appears to be an increased prevalence of diabetes mellitus, patients with other psychiatric diagnoses in this study did not demonstrate an increased prevalence of specific medical conditions as compared with the general population. Interestingly, among those who predominantly had substance abuse or dependence diagnoses (i.e., the "other category"), the prevalence of these obesity-associated medical conditions was generally low.

Our results do not appear to support previous reports that indicated a higher prevalence of type II diabetes mellitus in patients with schizophrenia and bipolar disorder.[12, 13] In a study published in 1999, Cassidy et al.[13] reviewed the charts of 345 patients with bipolar I disorder aged 20–74 years admitted to a state facility and calculated the observed frequency of previously diagnosed diabetes mellitus as compared to the expected frequency, after adjusting for gender and age based on an earlier national study published by Harris et al. in 1987.[30] These

Table 5. The odds ratios of having a specific psychiatric diagnosis and a specific comorbid medical condition

	Hypertension		Diabetes Mellitus		Hyperlipidemia		Cardiovascular Disease	
	Male	Female	Male	Female	Male	Female	Male	Female
Schizophrenia	1.19 (0.60–2.39)*	1.00 (0.39–2.60)	0.65 (0.22–1.90)	1.59 (0.50–5.06)	0.88 (0.39–1.98)	1.89 (0.68–5.28)	1.15 (0.36–3.72)	2.80 (0.68–5.28)
Schizoaffective	1.99 (0.91–4.33)	0.67 (0.25–1.81)	3.37 (1.22–9.34)	0.95 (0.28–3.21)	0.94 (0.34–2.61)	0.91 (0.30–2.27)	0.38 (0.05–3.04)	2.45 (0.33–17.99)
Major depressive disorder	0.69 (0.20–2.40)	3.39 (1.11–10.37)	0.51 (0.65–3.99)	2.56 (0.63–10.37)	1.47 (0.47–4.57)	0.46 (0.56–3.67)	1.73 (0.36–8.33)	–
Bipolar disorder	1.69 (0.71–4.02)	1.30 (0.47–3.61)	0.77 (0.17–3.48)	0.67 (0.14–3.16)	1.30 (0.47–3.66)	0.81 (0.22–3.00)	2.02 (0.52–7.80)	–
Other	0.41 (0.14–1.22)	0.22 (0.28–1.71)	0.50 (0.11–2.25)	–	0.62 (0.21–1.86)	0.79 (0.17–3.70)	0.34 (0.04–2.70)	–

**95% upper and lower confidence limits.*

authors concluded that the 9.9% prevalence of diabetes mellitus they found among hospitalized subjects with bipolar disorder was significantly higher than would have been expected from national norms (3.4%), as noted in the Harris et al. study. We did not correct for age or gender among the different psychiatric diagnostic groups in our study, because the numbers in the subsets were too small. However, it is pertinent to note more recent national norms based on the results of the NHANES III Survey,[23] which found that the prevalence of diagnosed diabetes mellitus in the U.S. population aged 20 years of age or older to be 5.1% and the prevalence of undiagnosed diabetes mellitus (fasting plasma glucose ⩾ 126 mg/ml) to be 2.7%, which when added together (7.8%) is a much higher rate than reported in the earlier study by Harris et al.[30] In an Italian study published in 1996, in which diabetes mellitus was diagnosed with the WHO criteria using a fasting plasma glucose > 140 mg/dl on two occasions, Mukherjee et al. reported a prevalence of type II diabetes mellitus of 15.8% among 95 patients with schizophrenia.[12] A methodologically rigorous Japanese study, which used a standard oral glucose tolerance test and the WHO criteria to screen patients for diabetes mellitus, and also included an age and sex matched control group, found a prevalence of 8.8% among 248 patients with schizophrenia compared with 5% among 239 sedentary office workers.[31] In the present study, 7.2% of our sample were diagnosed with diabetes mellitus (Type II), and there was a trend suggesting higher rates of diabetes mellitus among patients with schizoaffective disorder and a lower rate among those diagnosed mainly with substance and/or alcohol abuse or dependence. An important point in evaluating studies that report the prevalence of diabetes mellitus in psychiatric populations is to consider the methodology, especially the use of the oral glucose tolerance test and established criteria (WHO or American Diabetes Association) to determine the presence of established or undiagnosed diabetes mellitus. Our study was not prospective and rigorous in determining diabetes mellitus as were the two studies described earlier.

In the present study, we found that the prevalence of high blood pressure in obese adults was 38.4% in men and 32.2% in women, while it was 18.5% and 16.5%, respectively, for overweight men and women. The NHANES III survey, which defined high blood pressure as systolic blood pressure ⩾ 140 mm Hg and diastolic pressure ⩾ 90 or as being normotensive after the receipt of antihypertensive drugs, found a prevalence of hypertension of 23% among non-Hispanic Caucasians and 32% among non-Hispanic African-Americans.[22] In this study, 23% of the psychiatric patients with hypertension were of normal weight, whereas 29.5% were overweight and 47.5% were obese. When we compare these data to those obtained in the NHANES III survey, it appears that psychiatric patients may have an increased risk for essential hypertension especially if they are obese.

The NHANES III survey of data from 7775 participants 20 years of age or older (1988 through 1991) indicated that 20% of adults had cholesterol levels above 240 mg/dl as compared to 26% in the earlier NHANES II survey (1976 through 1980), while the proportion with desirable levels (< 200 mg/dl) rose from 44% to 49%.[24] Sempos et al. estimated then that nearly 52 million Americans 20 years of age and older would be candidates for dietary therapy, and that approximately 12.7 million Americans might be candidates for cholesterol

lowering drugs.[24] Our results indicated that 17.4% of patients with dyslipidemia were of normal weight, while 39.1% were overweight and 43.5% were obese. These numbers again appear to be higher than those reported for the general population.

The prevalence of the obstructive type of sleep apnea, which is more common than the central or mixed types, is estimated to be 4% among middle-aged men and 2% among middle-aged women.[20] In severely obese patients, a combination of hypoxia and hypercapnea may induce central apnea. It has been reported that most people with sleep apnea have a BMI > 30,[32, 33] and obesity has been reported to be a risk factor for sleep apnea.[28, 29] Six subjects in our sample were diagnosed with sleep apnea: five of those patients were obese and three of them were morbidly obese (BMI > 40). It is possible that less overt cases of obstructive sleep apnea are not readily diagnosed.

With regard to cardiovascular diseases, coronary heart disease is estimated to occur in the general population at a rate of 8.5% for men and 3.7% for women aged 45–64 years; among individuals 65 years and older, these percentages increase to 17.8% among men and 12% in women.[25] The risk for coronary heart disease increases among those with obesity,[21] with the risk more than three times higher in subjects with a BMI > 29 compared to those with a BMI < 21.[34] Our data do not indicate a higher prevalence of cardiovascular disease among psychiatric patients as compared to the general population.

Even though the odds ratios that either men or women in this study who were diagnosed with a specific psychiatric condition would also have a specific medical condition were not statistically significant, it is important to note that the number of patients in our sample suffering from specific medical conditions is relatively small for each subgroup. However, our data do appear to warrant further research. For instance, male patients diagnosed with schizoaffective disorder had higher odds for also having diagnoses of either essential hypertension or diabetes mellitus and female patients with major depressive disorder had higher odds for also having a diagnosis of diabetes mellitus. Male patients with major depressive disorder had higher odds of also being diagnosed with cardiovascular disease.

The present study has several limitations. First, our results may be relevant mainly to psychiatric inpatients admitted to long-term facilities. Second, a better comparison of our numbers with those of the general population would clearly be obtained if our results were adjusted to reflect the age, gender, and socioeconomic distribution of the general population. However, significantly larger numbers of subjects than those reported in this study are needed to adjust for these variables. Third, our results reflect cross-sectional data, and thus cannot provide information concerning cause and effect relationships among BMI categories, psychiatric diagnoses, and psychotropic drug treatment, on the one hand, and specific medical conditions, on the other. It is also possible that medical diagnoses and borderline disease states may have been "missed" in some subjects. Also, the absence of information concerning family history of specific medical conditions (e.g., diabetes mellitus) makes it difficult to estimate the relative contribution of genetic vulnerability compared with environmental factors, lifestyle issues, and medication effects. Finally, the medical diagnoses we looked at were already established at entry to the hospital. Therefore, data on the onset of illness for each medical condition were not available, and consequently, no conclusions about specific medications being associated with excessive weight gain and the induction of certain medical conditions (e.g., diabetes mellitus) can be drawn from these data.

The present data should be a cause for concern, especially in the context of the high prevalence of nicotine dependence, sedentary lifestyles, minimal exercise, and unhealthy dietary habits that may independently or additively contribute to excess morbidity and mortality in those who suffer from severe and persistent mental illnesses.

Nevertheless, the present data should be a cause for concern, especially in the context of the high prevalence of nicotine dependence, sedentary lifestyles, minimal exercise, and unhealthy dietary habits that may independently or additively contribute to excess morbidity and mortality in those who suffer from severe and persistent mental illnesses. Appropriate interventions targeting these areas may address an important clinical need for these individuals and improve their overall quality of life.

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