The Effects of Undertreated Chronic Medical Illnesses in Patients With Severe Mental Disorders

Andrea Fagiolini, MD, and Arianna Goracci, MD

Severe mental disorders such as bipolar disorder and schizophrenia often co-occur with chronic medical illnesses, especially cardiovascular disease and diabetes. These comorbidities are associated with a more severe course of mental illness, reduced quality of life, and premature mortality. Although the association between mental disorders and physical health complications has long been recognized, medical conditions remain undertreated in clinical psychiatric practice, and the life expectancy for individuals with serious psychiatric disorders is approximately 30% shorter than that of the general US population. Factors that are related to the mental illness (eg, cognitive impairment, reduced ability to function, and a lack of communication skills) as well as factors such as the high cost of medical care may make accessing general health care a difficult task for patients. Even when medical care is received by patients, the quality is often poor, and dangerous illnesses may be undiagnosed and untreated. In addition, harmful side effects of medications used to treat psychiatric disorders, unhealthy habits and lifestyles, and a possible genetic susceptibility to medical conditions increase the likelihood of comorbid physical conditions in patients with severe mental illness. Implementing behavioral interventions into clinical practice may help patients improve their overall health and prevent chronic medical conditions.
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Individuals with severe psychiatric conditions such as bipolar disorder and schizophrenia are at increased risk for morbidity and mortality resulting from premature cardiovascular and other medical diseases. However, comorbid medical illnesses may be undiagnosed and untreated in clinical practice.[1] Without treatment, medical comorbidities can result in adverse consequences including reduced quality of life, increased relapse rates, hospitalization, and premature death.[2] To ensure optimal treatment outcomes, clinicians must address both the mental and physical health of patients.

THE RELATIONSHIP BETWEEN MENTAL DISORDERS AND MEDICAL ILLNESSES

The correlation between mental illnesses and increased mortality rates has long been recognized. For example, even before the existence of modern psychotropic medications, 1920s reports[3,4] suggested that bipolar disorder and schizophrenia were associated with abnormal glucose metabolism. In the 1950s, a large British study[5] of both inpatients and outpatients (N = 626) reported that, according to patient questionnaires, patients with psychiatric disorders had more physical illnesses than the general population, increasing in frequency as the mental disorder severity increased; those with schizophrenia had higher rates of somatic disease, including cardiovascular disorders, than any other diagnostic group. A decade later, Roessler and Greenfield[6] studied the medical records of less severely ill patients (N = 951) who were all outpatients. The study found that more individuals with mental disorders experienced physical illnesses than those without mental disorders in all but 2 illness categories—skin disorders and endocrine disorders.

At present, patients with severe mental illnesses have much shorter life expectancies than the general populations of developed countries.[7] Although the life expectancy for the general US population is approximately 78 years,[8] the life expectancy for public mental health patients is at least 30% shorter.[9]

PREVALENCE AND CONSEQUENCES

The prevalence of cardiovascular disease is 1.5 to 2.0 times higher in people with depression than in the general population, and bipolar disorder is also associated with increased risk of cardiovascular disease and circulatory

From the Department of Neuroscience, Division of Psychiatry, University of Siena School of Medicine, Siena, Italy.
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Corresponding author and reprints: Andrea Fagiolini, MD, Department of Neuroscience, University of Siena, Viale Bracci 1, Siena 53100, Italy (e-mail: andreafagiolini@gmail.com).
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FOR CLINICAL USE

- Obesity, metabolic syndrome, diabetes, and cardiovascular disease are common among patients with severe mental illnesses, such as bipolar disorder and schizophrenia. Risk factors include medication side effects, genetic vulnerability, unhealthy lifestyles, and poor preventive medical care.
- Before prescribing an antipsychotic, thoroughly consider possible adverse side effects that may increase the likelihood of the patient's developing comorbid medical illnesses. Monitor the patient closely throughout treatment.
- Educate patients about healthy diet and exercise habits. Recommend gradual lifestyle changes for optimum health.

system deaths.[10] Obesity and diabetes are among the factors that greatly increase the risk of developing cardiovascular disease. Insulin resistance associated with obesity is probably the mechanism that brings about cardiovascular disease.[11] According to the American Heart Association, individuals with diabetes are 2 to 4 times more likely to develop cardiovascular disease than the general population.

Metabolic Syndrome and Obesity

Metabolic diseases and obesity are certainly not new medical conditions. However, the prevalence of these illnesses has rapidly grown in the general population and even more so in patients with mental disorders. Fagiolini et al[12] recently examined the prevalence of metabolic syndrome in patients with bipolar disorder (N = 441) and found that 40% of patients met the diagnostic criteria for metabolic syndrome. Further, patients with abdominal obesity had significantly worse mean scores on both the Clinical Global Impressions-Severity of Illness scale for bipolar disorder and the Global Assessment of Functioning scale than those without abdominal obesity ($P = .045$ and $P = .038$, respectively).

The exact causal relationship between mental illness and obesity is uncertain. However, psychiatric disorders and obesity most likely have a negative bilateral relationship; the mental illness contributes to obesity, and obesity contributes to the severity of the mental illness. A long-term trial[13] in patients with bipolar disorder (N = 50) reported a relationship between a history of more depressive episodes and the likelihood of being overweight or obese at study entry. Severe mental illness and/or its treatment can contribute to obesity through increased appetite, reduced energy expenditure, and lower ability to care for oneself. Conversely, research has shown that patients with bipolar disorder who are obese have more depressive and manic episodes,[14] more severe acute episodes,[14] longer duration of acute episodes,[14] shorter time to recurrence,[14] and more suicide attempts than those who are not obese.[15,16] Additionally, obese patients face discrimination and stigmatization on a daily basis (eg, health care, education, employment), which may lower self-esteem. Disorders related to obesity, such as sleep apnea, may also negatively affect the primary psychiatric disorder.

Diabetes

Patients with severe mental disorders have high rates of diabetes. In a retrospective study[17] of 243 psychiatric inpatients, aged 50 to 74 years, rates of type 2 diabetes in people with various diagnoses were 50% for schizoaffective disorder, 26% for bipolar I disorder, 18% for major depression, 18% for dementia, and 13% for schizophrenia. These findings were independent of medication effects; the diabetic patients were not taking a significantly higher amount of psychotropic drugs associated with new-onset diabetes. Another study[18] evaluated a sample of 345 hospitalized patients with bipolar disorder, aged 20 to 74 years, for comorbid diabetes. The rate of diabetes was 9.9%, significantly greater than the US national norm of 3.4% ($P < .001$). Also, De Hert et al[19] found that the difference between the prevalence of diabetes among patients with schizophrenia and among the general population substantially grew as patients aged; among patients aged 15 to 25 years, the prevalence of diabetes was 1.6% greater than in the general population, while among patients aged 55 to 65 years, the prevalence was 19.2% greater.

Cardiovascular Disease

Compared with the general population, individuals with serious psychiatric illnesses lose 25 to 30 years of potential life; the leading cause of premature death is cardiovascular disease.[20] In a meta-analysis[21] of 18 studies on mortality in patients with schizophrenia, all of the studies noted an increase in mortality, and in only 1 small study was the increase nonsignificant. Approximately 59% of excess deaths were attributed to natural causes, while suicide accounted for 28% of excess deaths. Cardiovascular disease was the most common cause of death in both males and females.

Table 1. Prevalence of Cardiovascular Comorbidities Among Patients With Schizophrenia and Their Matched General Population Comparison Group in Saskatchewan, Canada, 1994–1995[a]

Comorbidity	Prevalence (per 1000 patients)		Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)[b]
	Patients With Schizophrenia (N = 3,022)	Sample of General Population (matched) (N = 12,088)		
Acute myocardial infarction	12.2	9.5	1.3 (0.9 to 1.9)	1.3 (0.9 to 1.9)
Ischemic heart disease	58.6	60.6	1.0 (0.8 to 1.1)	1.1 (0.9 to 1.3)
Arrhythmias	51.3	36.7	1.4 (1.2 to 1.7)	1.5 (1.2 to 1.8)
Ventricular arrhythmias	2.6	1.4	1.9 (0.8 to 4.4)	1.7 (0.7 to 3.9)
Syncope and collapse	5.3	1.6	3.4 (1.7 to 6.6)	4.0 (2.0 to 7.9)
Heart failure	46.3	29.8	1.6 (1.3 to 1.9)	1.7 (1.4 to 2.2)
Stroke	27.5	14.6	1.9 (1.5 to 2.5)	2.1 (1.6 to 2.7)
Transient cerebral ischemia	14.6	6.4	2.3 (1.6 to 3.4)	2.6 (1.7 to 3.7)
Diabetes	91.7	50.5	1.9 (1.6 to 2.2)	2.1 (1.8 to 2.4)

[a]Reprinted with permission from Curkendall et al.[22]
[b]Odds ratios were adjusted for age, sex, and medical risk factors using logistic regression. The risk factors used varied by outcome, as follows: arrhythmia and acute myocardial infarction were adjusted for hypertension and diabetes; ventricular arrhythmia was adjusted for diabetes; syncope was adjusted for hypertension and prior cardiovascular disease; stroke was adjusted for hypertension, hyperlipidemia, diabetes, and combination of hypertension and hyperlipidemia; transient cerebral ischemia was adjusted for hypertension, hyperlipidemia, diabetes, and serious pulmonary disease; heart failure and ischemic heart disease were adjusted for hypertension, diabetes, hyperlipidemia, serious pulmonary disease and the combinations hypertension/hyperlipidemia, diabetes/hyperlipidemia, and hypertension/diabetes.

A large study[9] examined the standardized mortality ratios (SMRs)—calculated by dividing the number of observed deaths by the number of expected deaths based on the general population—among public mental health patients in 8 US states. An SMR of > 1.0 indicated a higher relative risk of death than that of the general population of that state; the SMRs for patients ranged from 1.2 to 4.9. The majority of patients died from natural causes, and the leading cause of death for patients, as well as for the general state populations, was heart disease.

A Canadian study[22] found that cardiovascular diseases were more prevalent among patients with schizophrenia than in the general population (Table 1). Also, the rate of death with cardiovascular contributing causes was significantly higher among patients with schizophrenia, with an adjusted risk ratio of 2.2 (95% CI = 1.7 to 2.8).

Cardiovascular disease in patients with bipolar illness is also common. For example, a Swedish study[23] in patients with bipolar disorder (N = 15,386) found that most excess deaths in the bipolar group were due to natural causes. The SMR for men was 1.9 and for women was 2.1 for all natural causes of death. Cardiovascular disease was the leading cause of death. The SMR for cardiovascular disease was 1.9 for men and 2.6 for women.

CONTRIBUTORS TO POOR HEALTH AND UNDERTREATMENT

Factors that are related to psychiatric disorders, such as side effects of medications, unhealthy lifestyles, and a possible genetic vulnerability, increase the likelihood of poor health and comorbid medical illnesses in patients. Also, because patients frequently do not seek medical care, have limited access to care, or receive lower quality physical health care than patients without mental disorders, medical illnesses often remain undetected or undertreated.

Medication Side Effects

A primary contributor to the development of illnesses in patients may be side effects of medications commonly used to treat severe mental disorders. For example, atypical antipsychotics, which are often used to treat schizophrenia and bipolar disorder, increase the likelihood of developing obesity, diabetes, hyperglycemia, hyperlipidemia, and cardiovascular disease.[24] A recent 6 month study[25] assessed the changes in risk factors for cardiovascular disease and type 2 diabetes in first-episode psychotic patients treated with atypical antipsychotic medications compared with a control group. At baseline, percentages of participants who were overweight or obese, dyslipidemic, hyperglycemic, and hyperinsulinemic were similar between treatment groups. At 6 months, the patient group had significant increases in body mass index (BMI) (P = .0002), leptin (P = .0215), cholesterol (P = .0129), glucose (P = .0449), and insulin (P = .0161).

To avoid the potentially dangerous outcomes associated with antipsychotic treatment, clinicians should record medical history, weight, and blood chemistry of patients at baseline. Risk factors for illnesses such as diabetes and cardiovascular disease should be noted and closely monitored throughout treatment. Patients' weight, BMI, waist size, blood pressure, fasting glucose, and lipid levels should be checked regularly. The possible side effects of these medications should also be thoroughly explained to patients.[26]

Unhealthy Lifestyle Habits

Patients with serious mental disorders often have habits that contribute to poor health. According to a report

from the National Institute of Mental Health,[27] smoking rates are extremely high in individuals with mental disorders, especially in those with anxiety disorders, depression, and schizophrenia. A meta-analysis[28] of worldwide studies reported that heavy smoking and high nicotine dependence were more prevalent in smokers with schizophrenia than in the general population but not compared with a severely mentally ill control group. However, patients with schizophrenia had a higher prevalence of ever smoking and a higher risk of daily smoking than both the general population and the control group.

Studies[29,30] have shown that individuals with severe psychiatric illnesses are more likely to consume an unhealthy diet and to exercise less than the general population. A large cross-sectional study[29] compared the diet and exercise habits of patients with bipolar disorder (n = 2,032) and those with no serious mental illness (n = 3,065). The study found that patients with bipolar disorder were significantly more likely than those without a mental illness ($P < .001$) to have poor exercise habits (eg, walking infrequently), poor eating behaviors (often consuming fewer than 2 daily meals), problems obtaining or cooking food, and weight gain of ≥ 10 pounds in the last 6 months. Another study[30] compared the diet, cigarette and alcohol consumption, and exercise habits of patients with schizophrenia (N = 102) to those of the general population. The study concluded that patients' diets were higher in fat and lower in fiber compared with those of the general population, and although patients rarely exercised, they were not significantly more obese than the general population. Patients with schizophrenia smoked heavily but drank less alcohol than the general population.

The tendency of patients with severe mental illness to be physically inactive greatly contributes to their poor health. Sedentary behavior is associated with an increased risk of diabetes and obesity. A large 6-year study[31] of women in 11 states found that each 2-hour/day increase in television viewing was associated with an approximate 23% increase in obesity and 14% increase in diabetes; each 2-hour/day increase in sitting at work was associated with a 5% increase in obesity and a 7% increase in diabetes. The Centers for Disease Control and Prevention and the American College of Sports Medicine reported that inactivity increases the relative risk of coronary artery disease by a factor between 1.5 and 2.4, an increase equivalent to that due to smoking, hypertension, or elevated blood cholesterol.[32] According to the World Health Organization (WHO),[33] a sedentary lifestyle is one of the 10 leading causes of death and disability worldwide. The WHO also attributed at least 2 million deaths per year to physical inactivity and estimated that up to 80% of cases of premature coronary heart disease are a result of the combination of inactivity, improper diet, and smoking.

Genetic Factors

Genes that contribute to schizophrenia, bipolar disorder, and other severe mental disorders may also contribute to the development of medical illnesses. In fact, a mutation of the methylenetetrahydrofolate reductase (MTHFR) gene, which increases the risk of premature cardiovascular disease, has been associated with mental illness.[34] Arinami and colleagues[35] reported that the presence of the MTHFR gene variant, T677 allele, was observed significantly more often in patients with schizophrenia ($P = .0006$) and major depression ($P = .005$) than in control subjects. However, another study[34] did not observe this gene variant significantly more frequently in patients with schizophrenia, bipolar disorder, or unipolar disorder compared with those without mental disorders. Vonk et al[36] found that autoimmune thyroiditis is related to bipolar disorder and to the genetic susceptibility to developing bipolar disorder. Research[37] has also suggested that the pro-melanin-concentrating hormone gene may predispose certain patients with bipolar disorder or schizophrenia to obesity when they take antipsychotic medications. While susceptibility to 2 or more conditions is often observed,[38] more genetic research is needed to make definite conclusions.

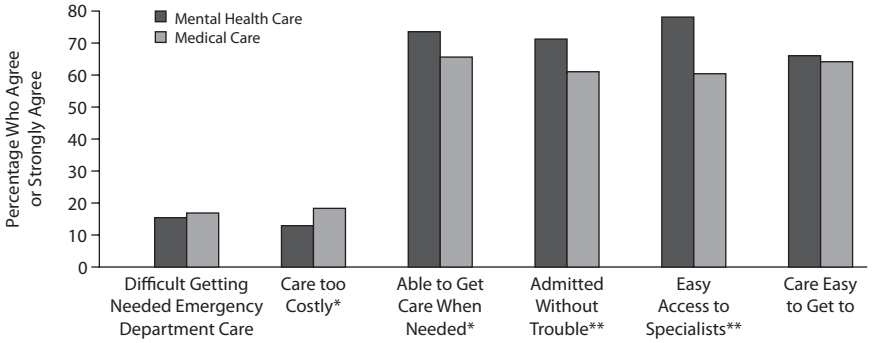
Access to and Adequacy of Medical Care

Rates of undiagnosed and untreated medical illnesses are high in those with severe mental disorders.[39] Multiple factors contribute to this lack of care; some factors are related to the mental illness, such as reluctance to seek care and comply with medication regimens, while other factors relate to the quality of medical care offered to those with severe mental illness.

Patients with severe mental illnesses are more likely to have limited access to general health care than those without mental illnesses.[40] Examples of access barriers are the tendency of clinicians to focus on mental rather than physical health, poor communication,[9] and the high cost of care.[41] One study[41] compared access barriers to medical and mental health care among veterans with bipolar disorder (N = 435). According to patient surveys, medical care was more difficult to access than mental health care (Figure 1). Also, Kilbourne and colleagues[40] compared patient opinions of access to and satisfaction with health care between those with and without serious mental disorders. The study concluded that patients with bipolar disorder were significantly more likely to report difficulty in obtaining necessary care ($P < .05$) and patients with schizophrenia were significantly more likely to report displeasure with provided care ($P < .001$) than those with no mental illnesses.

Adverse consequences related to mental illness (eg, cognitive impairment, social isolation, and suspicion)[42] may deter patients from seeking care; for example, holding a job that provides health care insurance may be

Figure 1. Barriers to Accessing Mental Health and General Medical Care According to 435 Veterans With Bipolar Disorder[a]



[a]Reprinted with permission form Zeber et al.[41]
*$P < .05$.
**$P < .001$.

difficult.[20] Research[39,43] has shown that many patients with severe mental illnesses rarely seek general medical care. Cradock-O'Leary and colleagues[39] reported that patients with psychiatric illnesses made fewer medical visits in 1 fiscal year compared with those without psychiatric illnesses; patients with the most severe mental illnesses made the fewest visits. Patients with schizophrenia, bipolar disorder, or an anxiety disorder and comorbid diabetes or hypertension made substantially fewer medical visits than those without mental disorders. Further, patients with substance use, depression, bipolar disorder, or an anxiety disorder who were older than 50 years were more likely to receive no medical care during this time period than those without mental disorders. Finally, Salsberry et al[43] compared the use of general medical care by patients with schizophrenia, affective disorders, paranoid disorders, and anxiety disorders. While outpatient services were often used by all illness groups, primary and preventive services were scarcely used. Overall, of the 4 groups, patients with schizophrenia made the fewest medical visits.

When patients do seek medical care, a lack of social skills and the stigma of having a mental disorder may affect the likelihood of receiving quality care.[42] Unfortunately, the health care system is often unequipped to handle the behavioral and emotional problems of patients with chronic mental illnesses.

Studies[44,45] have investigated the quality of medical care received by patients with mental illnesses. A national, cross-sectional study[44] compared the quality of medical care for patients with diabetes and a mental illness to that of diabetic patients with no mental illness. The study found that more patients with mental disorders received care below diabetes performance measures than those without mental disorders. The unadjusted odds ratios between patients with mental illnesses and those without were 1.24 for no hemoglobin A(1c) testing (95% CI = 1.22 to 1.27), 1.25 for no low-density lipoprotein cholesterol testing (95% CI = 1.23 to 1.28), 1.05 for no eye examination (95% CI = 1.03 to 1.07), 1.32 for poor glycemic control (1.30 to 1.35), and 1.17 for poor lipemic control (1.15 to 1.20). Quality of care was worse for patients with certain mental illnesses—psychotic disorders, manic disorders, substance use disorders, and personality disorders—and worsened with an increasing number of co-occurring mental illnesses.

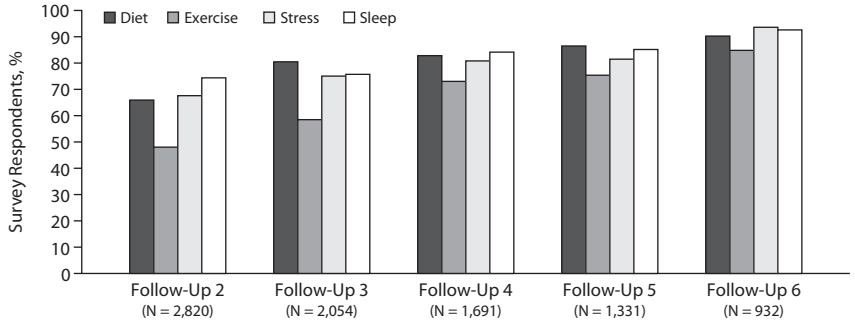
A recent British study[45] assessed whether patients with coronary heart disease and either bipolar disorder or schizophrenia were less likely to receive medical care that met national standards than those without mental disorders. Although mentally ill patients received nearly equal care to those without psychiatric conditions, patients with schizophrenia were 15% less likely to have a current prescription for a statin medication (95% CI = 8% to 20%) and 7% less likely to have a current record of cholesterol level (95% CI = 3% to 11%).

RECOMMENDATIONS FOR IMPROVING PATIENTS' HEALTH

Behavioral interventions may help patients adopt healthier lifestyles to prevent medical illnesses. In fact, a meta-analysis[46] of controlled studies using pharmacologic or nonpharmacologic interventions for weight loss or weight maintenance in patients with schizophrenia found that behavioral interventions resulted in more weight loss than standard care. Pharmacologic interventions were also effective for modest weight loss.

A recent study[47] investigated the effectiveness of behavioral intervention, nutritional education, and exercise on the BMI and weight of inpatients with schizophrenia and schizoaffective disorders. After 3 months, those who received the multimodal intervention had significant decreases in BMI and weight ($P = .017$); weight loss was maintained at the 1-year follow-up ($P = .006$).

Figure 2. Percentage of Survey Respondents Who Made Positive Changes in Diet, Exercise, Stress Management, and Sleep at Each Monthly Follow-Up During a 6-Month Behavioral Intervention Program[a,b]



[a]Reprinted with permission from Hoffmann et al.[48]
[b]The number of participants who returned surveys is indicated in parentheses for each follow-up.

One example of a program that benefits patients' health is the Solutions for Wellness Personalized Program, an ongoing nationwide 6-month program that creates individual nutrition, exercise, stress management, and sleep improvement plans for patients with serious mental illnesses.[48] According to responses on monthly follow-up surveys, patients improved their diet, exercise, stress management, and sleep habits throughout the program (Figure 2). After 6 months of participation, of the partial completers, 91% had made positive diet changes, 85% had started exercising, 93% improved their sleep habits, and 94% had lower stress levels. In addition, 97% of partial completers felt somewhat to very confident that these changes could be sustained. Full program completers who made positive diet ($P = .014$) or exercise ($P = .035$) changes had significantly greater decreases in BMI from baseline compared with those who did not make these changes.

Clinicians should implement specific behavioral interventions in an effort to improve the diet and exercise habits of patients (Table 2). Many patients with mental disorders do not know the components of a healthy diet; nutrition education may be beneficial. Some patients, for example, may not know that frying food is less healthy than other methods of cooking and may not know how to cook any other way.

Although educating patients about healthy food and exercise habits is recommended, patients need to understand that lifestyle changes should be gradual. Clinicians should not set patients up for failure by expecting too much too soon; for instance, patients should not starve themselves or try to run for 2 hours per day after years of not exercising. Rather, patients should be advised to avoid high calorie, high fat, and nutritionally poor food such as fast food and unhealthy snacks. The importance of consuming healthy alternatives such as fresh fruit and vegetables, fish, and lean meats in a balanced way should be stressed by clinicians whenever possible.

Table 2. Examples of Behavioral Interventions to Improve the Health of Patients With Severe Mental Illnesses

Area of Concern	Education Topics	Suggested Tools
Diet	Healthy eating behavior (including snacking)	Food plans
		Food diaries
	Cooking	Food exchange tables
	Food shopping	
Exercise	Physical activity	Daily activity list
		Exercise plans
		Exercise diaries

Exercise for Weight Loss

The Surgeon General recommends 150 minutes of moderate exercise per week, or 30 minutes of exercise 5 days a week, to maintain health.[49] However, in patients who are obese, more time should be spent exercising in order to lose weight, and physical exercise should be accompanied by proper diet to result in significant weight loss. For example, if a patient walks for 1 hour per day, about 200 calories are burned. While this is beneficial in terms of cardiovascular health, this energy expenditure will not result in substantial weight loss. More strenuous physical activities, such as jogging, may be necessary. Further, if the patient consumes a muffin (approximately 500 to 600 calories) after each walk, he or she could gain weight because more calories have been taken in than used.

Diet for Weight Loss

Clinicians should remember that, in order to maintain current weight, consuming approximately 12 calories per pound is required. For instance, a patient who weighs 200 pounds needs to consume 2,400 calories per day to sustain

that weight. Conversely, if the patient who weighs 200 pounds needs to lose weight, his or her calorie intake should be reduced by 500 calories per day or 3,500 calories per week, since 3,500 calories is equivalent to 1 pound of fat. While losing 1 pound of weight per week may sound small, a pound of fat is actually a substantial amount. If patients lose a large amount of weight too quickly, they are likely losing water weight. Also, most people who experience rapid weight loss without gradual behavior modifications will return to their previous weight. Losing weight hastily increases the likelihood of developing cholesterol gallstones. Further, many toxins are stored in fat tissue and a rapid weight loss may release those toxins too quickly.

CONCLUSION

Patients with severe mental disorders, such as bipolar disorder and schizophrenia, are at increased risk for potentially lethal comorbid medical illnesses that decrease the lifespan and adversely affect the course of the psychiatric disorder. Cardiovascular and metabolic illnesses are among the most frequent and burdensome disorders that affect psychiatric patients. Multiple factors contribute to these medical conditions, such as medication side effects, unhealthy lifestyles, and possibly a genetic vulnerability to both medical and mental illnesses. However, the quality of health care received by psychiatric patients is often poor, and, as a result, dangerous medical illnesses may remain undiagnosed and untreated. To prevent and manage these comorbidities, clinicians must focus on both the mental and physical health of patients. Behavioral interventions that educate patients about healthy food and exercise choices should be incorporated into clinical practice, and adverse side effects should always be considered when deciding on pharmacotherapy for psychiatric disorders. Finally, immediate attention must be given to existing medical comorbidities.

Disclosure of off-label usage: The authors have determined that, to the best of their knowledge, no investigational information about pharmaceutical agents that is outside US Food and Drug Administration–approved labeling has been presented in this article.

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