Caring for the Whole Person: Integrated Health Care for Older Adults with Severe Mental Illness and Medical Comorbidity

Stephen J. Bartels, MD, MS

Schizophrenia is associated with a 20% shorter life span than for the general population[1] and high rates of chronic medical illnesses, including diabetes mellitus (DM), hypertension, heart disease, and emphysema.[2] Recent research suggests that premature mortality and excess physical disability in schizophrenia is associated with a variety of extrinsic risk factors that are potentially preventable, including unhealthy lifestyles, metabolic and neurological side effects of psychiatric medications, and poor health care. The aging of the population of persons with severe mental illness (SMI) further contributes to growing rates of medical comorbidity. The number of older adults with major psychiatric illness is predicted to more than double by 2030.[3] This paper provides an overview of selected research findings on the prevalence and causes of medical comorbidity in schizophrenia and other SMIs, current challenges to providing quality health care, and suggested directions for integrated models of care for the older person with a SMI.

EARLY MORTALITY AND RESEARCH ON MEDICAL COMORBIDITY IN SMI

Approximately 3% of American adults have SMI, including 1% with schizophrenia and 2% with depression or bipolar disorder that is refractory to treatment.[4] In older adults, the prevalence of schizophrenia and bipolar disorder decreases to approximately 0.5% and 0.2%, respectively, whereas the prevalence of major depression ranges from less than 1% to 5%.[5,6] The lower prevalence of schizophrenia in older persons is most likely due to remission of psychotic symptoms[7,8] for some individuals and premature mortality. Schizophrenia is associated with a 20% shorter life expectancy than for the general population.[1] The lives of men with schizophrenia are 10 years shorter than those of men without schizophrenia, whereas the lives of women with schizophrenia are about 9 years shorter than those of women without schizophrenia.[9–12] Factors that contribute to premature death and poor outcomes for persons with schizo-

phrenia and other SMIs include high prevalence of comorbid medical disorders, poor health behaviors, and inadequate health care.[10–17]

The research literature on medical comorbidity and health care for persons with SMI consists of studies specific to schizophrenia and studies that also include individuals with other psychotic-spectrum disorders, bipolar disorder, and treatment-refractory severe depression, collectively referred to as SMI. Throughout the following overview of medical comorbidity and health care, studies on the subgroup of persons with the diagnosis of schizophrenia and on the larger group of persons with SMI are included. Much of what is known about medical comorbidity and health care in persons with SMI has been derived from samples of young and middle-aged mentally ill persons. Hence, in the following overview of this topic, data on comorbidity and health care for the larger population, which includes younger and middle-aged persons, are included, in addition to the few studies specific to the older adult population ($\geq$65), where available.

MEDICAL COMORBIDITY IN YOUNG AND MIDDLE-AGED PERSONS WITH SMI

A substantial research literature documents the high prevalence of medical comorbidity in young and middle-aged adults (18–64) who have SMI. Approximately half (48%) of adults with schizophrenia in this age group have at least one current medical condition, and one-fifth (20%) have multiple current medical conditions.[18] SMIs are associated with higher rates of comorbid medical conditions, such as DM, cardiovascular disease, gastrointestinal disorders, skin infections, hepatic disorders, asthma, and acute respiratory ailments than in non-mentally ill adults.[19,20] High rates of comorbid medical illnesses are found in adults with psychotic disorders (schizophrenia and schizoaffective) and adults with affective disorders (depression and bipolar disorder).[20] Table 1 compares the prevalence of common medical disorders in adults aged 18 to 65 receiving community-based psychiatric services with the prevalence of medical disorders in the general population. Higher rates are found for almost all medical disorders in individuals with schizophrenia and mood disorders, with the most pronounced differences found for DM; cardiovascular disease; and respiratory, renal, and liver disorders. Consistent with other reports,[22,23] rates of medical comorbidity are

From the Department of Psychiatry, Dartmouth Medical School, Lebanon, New Hampshire; Aging Services Research, New Hampshire-Dartmouth Psychiatric Research Center, Lebanon, New Hampshire; and State of New Hampshire Division of Behavioral Health, Concord, New Hampshire.

Address correspondence to Stephen J. Bartels, MD, MS, New Hampshire-Dartmouth Psychiatric Research Center, 2 Whipple Place, Suite 202, Lebanon, New Hampshire 03766. E-mail: Stephen.J.Bartels@Dartmouth.edu

Table 1. Medical Conditions in Adults (Aged 18–65) with and without Schizophrenia and Mood Disorders, Compared with the General Population

Medical Condition	Schizophrenia (n = 100)[20]	Mood Disorders (n = 100)[20]	General Population (n = 172,764)[21]
	%		
Diabetes mellitus	10.3	16.0	4.7
Cancer	3.1	7.5	4.2
Hypertension	24.7	36.2	15.5
Stroke	2.2	6.5	1.2
Asthma	16.3	19.4	7.0
Emphysema	9.8	6.5	0.9
Chronic bronchitis	15.2	25.0	4.2
Ulcers	5.2	16	6.6
Liver disease	9.3	6.4	1.2
Kidney disease	3.1	4.3	0.9

Adapted with permission from Sokal J, Messiac E, Dickerson FB, et al. Comorbidity of medical illness among adults with serious mental illness who are receiving community psychiatric services. J Nerv Ment Dis 2004;192:421–7.

highest for depression, most likely due to the bidirectional relationship of medical illness as a cause of depressive symptoms and depression as a cause of poor outcomes and lower rates of recovery in medical disorders.[24]

Medicaid claims provide a similar perspective on high rates of medical comorbidity in schizophrenia for adults aged 18 to 64. In a study of Massachusetts Medicaid beneficiaries, those treated for schizophrenia had a greater prevalence of asthma (8.5% vs 5.5%) and acute respiratory disorders (pneumonia and influenza) (32.8% vs 26.3%) than those without schizophrenia. Similarly, those with schizophrenia had greater rates of hypertension (10% vs 9.3%) and heart disease (8.8% vs 5.6%).[19] Finally, Medicaid beneficiaries with schizophrenia had co-occurring DM at a rate more than 2.5 times greater than persons without schizophrenia.[19] Increased rates of DM in persons with schizophrenia have been documented in a substantial research literature ranging from 7% to 16%.[19,25–28]

MEDICAL COMORBIDITY IN OLDER PERSONS WITH SMI

A limited research literature on older adults with SMI (aged ≥65) confirms the high prevalence of co-occurring major medical disorders.[17] For example, in older veteran outpatients with SMI (aged ≥ 60, n = 90), significant medical comorbidity (defined as at least one concurrent major medical illness) was found in 92% of depressed patients, 75% of persons with bipolar disorder, and 67% of persons with schizophrenia. Across diagnostic categories, rates for cancer were higher in persons with depression, and dermatological conditions were significantly higher in persons with schizophrenia.[29]

High rates of medical comorbidity are also found in older inpatients hospitalized for psychiatric illness. In a chart review study of 95 psychiatric inpatients aged 60 and older (including 47% with mood disorders, 20% with organic disorders, and 28% with schizophrenia or other psychotic disorders), almost all (91.5%) had one or more significant medical problems, with an average of 1.9 medical conditions. Nearly one-third of the sample had one medical illness (30.6%), 32.6% had two medical illnesses,

and 26.3% had three to four medical illnesses. The most prevalent medical disorders included cardiovascular (34%), neurological (22%), genitourinary (17%), respiratory (17%), gastrointestinal (17%), endocrine (16%), and hematological or oncological (16%).[30] Finally, in a larger study of older psychiatric inpatients (aged ≥50, n = 868) persons with psychotic disorders (n = 90) had an average of 4.7 medical disorders, and persons with mood disorders (n = 329) had 5.6 medical disorders. Medical illnesses were slightly more prevalent in persons with mood disorders relative to schizophrenia, including circulatory disorders (83.5% vs 60.0%), endocrine disorders (52.0% vs 45.5%), musculoskeletal disorders (47.4% vs 40.0%), and digestive disorders (62.9% vs 37.8%).[31]

Older age is associated with greater rates of medical illness in persons with SMI. Table 2 compares the prevalence of common medical disorders in younger and older Medicaid beneficiaries with schizophrenia and depression in an analysis conducted for this review. New Hampshire Medicaid claims for DM, chronic obstructive pulmonary disease/asthma, and cardiovascular disease for 2001 were tabulated for persons with schizophrenia and mood disorders (major depression and bipolar disorder), stratified by younger and older age. The highest rates of comorbidity were found for mood disorders, consistent with comparisons for young adults (Table 1). Higher rates of medical illness were found in older than younger persons with schizophrenia and mood disorders. For instance, the prevalence of cardiovascular disease was greater in older adults with schizophrenia or mood disorders. Respiratory disease and multiple comorbid illnesses were more prevalent in older adults with schizophrenia than in younger persons with schizophrenia.

FACTORS CONTRIBUTING TO MEDICAL ILLNESS IN OLDER PERSONS WITH SMI

The aging of the population of individuals with schizophrenia compounds the effect of medical illness on the course and outcome of schizophrenia.[17] Overlapping, but different, age-associated factors contribute to growing rates of co-occurring medical disorders in younger than in older

Table 2. Prevalence of Selected Medical Illnesses in Older ($\geq$65) versus Younger (18–64) New Hampshire Medicaid Beneficiaries with Schizophrenia or Mood Disorders in 2001

	Schizophrenia				Mood Disorders			
	Age				Age			
	$\geq$65 (n = 314)	18–64 (n = 1,821)			$\geq$65 (n = 376)	18–65 (n = 3,136)		
Illness	%		χ^{2*}	*P*-value	%		χ^{2*}	*P*-value
Diabetes mellitus[†]	10.8	8.6	1.60	.21	12.2	9.9	1.97	.16
COPD/asthma[‡]	10.5	5.8	9.67	<.001	12.2	12.7	0.07	.79
Cardiovascular disease[§]	22.3	8.2	57.93	<.001	27.1	16.0[a]	28.95	<.001
Two or more illnesses[‖]	6.7	4.1	4.12	.04	8.8	7.8	0.46	.50

Note: Analyses included a comprehensive assessment of 2001 New Hampshire Medicaid beneficiaries (including outpatient, inpatient, and long-term care settings). If a recipient had two or more psychiatric disorders, the following decision rule was used for assignment to diagnostic category. Any person diagnosed with a schizophrenia spectrum disorder at any time in the year was placed in the schizophrenia group (International Classification of Disease, Ninth Revision (ICD-9) codes 295.0–295.99). Next any person not in the schizophrenia group diagnosed with depression at any time in the year was placed in the depression group, which included major depression (ICD-9 codes 296.2–296.39) and bipolar disorder (ICD-9 codes 296.0–296.09, 296.4–296.7, 296.89).
* degree of freedom = 1.
[†] ICD-9 code 250.
[‡] ICD-9 codes 491–496, including chronic bronchitis, emphysema, asthma, bronchiectasis, extrinsic allergic alveolitis, and chronic airways obstruction, not elsewhere classified.
[§] ICD-9 codes 393–429 or 440–459, including chronic rheumatic heart disease (393–398), hypertensive disease (401–404), ischemic heart disease (410–414), diseases of pulmonary circulation (415–417), other forms of heart disease (420–429), diseases of arteries, arterioles, and capillaries (440–448), diseases of veins and lymphatics, and other diseases of the circulatory system (451–459).
[‖] Diabetes mellitus, chronic obstructive pulmonary disease (COPD)/asthma, or cardiovascular disease.

persons with SMI. For example, younger persons with SMI are at especially high risk of infectious diseases such as hepatitis and human immunodeficiency virus (HIV) associated with high rates of substance abuse and unsafe sexual practices in this age group.[32,33] Both younger and older persons with SMI have increased risk for medical illness due to poor health behaviors, including smoking, alcoholism, poor diet, and lack of exercise.[34–37] A convergence of lifestyle and health behaviors associated with SMI[38] and health-related side effects of antipsychotic medication[39] most likely cause compromised health and increased rates of chronic medical illness in older persons with SMI. In addition to poor diet and sedentary behaviors, exposure to second-generation (atypical) antipsychotic medications is associated with hyperlipidemia, weight gain, glucose intolerance, and greater rates of DM.[28,34] Medical comorbidity in individuals with schizophrenia has also been linked to complications of the disorder itself (e.g., catatonia, polydipsia).[14]

The older person with SMI is subject to the double jeopardy of an increased risk of medical illness associated with advancing age in conjunction with the increased risks of medical illness associated with having a SMI. The cumulative long-term effect of poor health behaviors and long-term exposure to psychiatric medications with substantial metabolic and neurological side effects places the older person with SMI at a greater risk of respiratory, cardiovascular, and endocrine disorders. Older age also complicates mental and physical functioning in persons with SMI because of the neurocognitive deficits that can increase in late life.[40,41] Finally, older persons with SMI have a greater likelihood of poorer quality of healthcare relative to non-mentally ill older adults.[42,43] A fragmented healthcare

system presenting barriers to adequate medical care may worsen medical conditions.[14,44]

LIFESTYLE AND HEALTH BEHAVIORS ASSOCIATED WITH SMI

Lifestyles associated with poor health are observed early in the course of SMI, and these behaviors (or their effects) generally continue throughout the life cycle. For example, in younger adults with SMI, rates of alcohol- and drug-use disorders range between 15% and 60% and are associated with serious medical problems, including HIV and hepatitis.[14,32,45] Substance abuse in schizophrenia is also associated with poor outcomes that include an increase in psychotic symptoms, poorer treatment compliance, housing instability, and homelessness.[15] Although the incidence of alcohol- and substance-use disorders in SMI decreases with age, the alarming rate of hepatitis C and long-term (and potentially fatal) effects on hepatic functioning place the current cohort of middle-aged persons at long-term risk.[32,33] Although the incidence of dual-diagnosis (co-occurring substance abuse and mental illness) is significantly lower in older adults (6.9%) than in younger adults (26.7%),[45] dually diagnosed older adults have more psychiatric outpatient visits than dually diagnosed younger adults and older adults with psychiatric or substance-use disorders alone.[45] In addition, they have longer inpatient substance abuse stays and more outpatient substance abuse stays than older adults with psychiatric or substance-use disorders alone.[45]

Tobacco use is the most common form of substance abuse in individuals with SMI. Between 60% and 80% of individuals with schizophrenia are nicotine dependent, compared with one-third of individuals in the general

population.[46] High rates of smoking are likely to contribute to increased rates of asthma, emphysema, and other chronic and acute respiratory disease found in schizophrenia.[20] In addition, high rates of smoking directly contribute to the increased risk of hypertension and heart disease, which is further compounded by lack of exercise.

Sedentary lifestyle has been documented as a common risk factor for many individuals with SMI. Fewer than one-fifth of individuals with schizophrenia engage in one or more periods of moderate exercise weekly.[47] Poor diet has also been documented in schizophrenia, including significantly lower consumption of fruits and vegetables than in age- and sex-matched controls.[48] Individuals with schizophrenia have diets that are higher in fat and lower in fiber than persons of similar socioeconomic status without psychiatric illness.[47] These behaviors may combine with the metabolic side effects of antipsychotic medications to produce the high rates of obesity, DM, and heart disease found in persons with SMI. Finally, the added effect of age-associated changes in metabolism, physiology, and physical activity combined with increased rates of related chronic diseases places the older person with SMI at especially high risk for poor health outcomes.

HEALTH-RELATED SIDE EFFECTS OF ANTIPSYCHOTIC TREATMENT

Reports of an increased risk of obesity, DM, and other medical conditions associated with second-generation (atypical/novel) antipsychotics have stimulated recent expert consensus recommendations on physical health monitoring.[2,39] These recommendations add to earlier literature supporting screening for extrapyramidal side effects and tardive dyskinesia associated with first-generation (typical/conventional) antipsychotics, especially in older persons who are at increased risk for these side effects.[49–52] Forty-two percent of individuals with schizophrenia meet criteria for obesity (body mass index (BMI) $> 27 \, \text{kg/m}^2$), compared with 27% of the general population.[53] First- and second-generation antipsychotics are associated with weight gain,[54,55] with selected agents accounting for the greatest increases in weight. For example, a meta-analysis of studies evaluating mean weight gain over 10 weeks of treatment with atypical antipsychotics found the highest weight gain

for clozapine (4.45 kg) and olanzapine (4.15 kg), with lower (but significant) weight gain with sertindole (2.92 kg) and risperidone (2.10 kg) and the lowest weight gain for ziprasidone (0.04 kg).[56] Because of the strong association between obesity and medical conditions such as heart disease, hypertension, osteoarthritis, and DM, it is now recommended that weight and BMI be monitored before initiating or changing antipsychotic medication, and that weight then be monitored at all treatment visits over the first 6 months and quarterly thereafter.[2]

The high prevalence of DM in schizophrenia is strongly associated with high rates of obesity, although it is possible that atypical antipsychotics also contribute to increased risk of DM by altering metabolic variables. A recent expert consensus panel convened by the American Diabetes Association and the American Psychiatric Association confirmed a strong association between several atypical antipsychotic agents and hyperlipidemia and decreased glucose tolerance.[39] For example, clozapine and olanzapine can increase insulin resistance,[57,58] and increased rates of DM have been found in patients taking clozapine, olanzapine, and quetiapine. The association between second-generation antipsychotics and DM is strongest in patients younger than 40, suggesting that the added risk may decrease (rather than increase) with older age.[59] Based on the overall association of atypical antipsychotics with metabolic alterations, clinicians prescribing atypical antipsychotics are now encouraged to incorporate metabolic and weight monitoring in routine psychiatric practice. Consensus guidelines recommending metabolic screening and physical health measures as a part of routine clinical practice are shown in Table 3. These guidelines include recommendations for a fasting plasma glucose test, although a hemoglobin A1c test can also be considered when a fasting glucose test is not feasible.[2] In addition, lipid profile recommendations reflect the association between some second-generation antipsychotics and hyperlipidemia and the relationship between elevated cholesterol and triglyceride levels to hypertension, cardiovascular disease, and myocardial infarction (MI).

Other side effects of antipsychotic medications of particular relevance to older persons include QTc-interval prolongation on electrocardiogram, hyperprolactinemia, and cataracts.[2] For example, the first-generation antipsychotics thioridazine, mesoridazine, and pimozide are contraindicated

Table 3. American Diabetes Association/American Psychiatric Association Consensus on Antipsychotic Drugs: Monitoring Protocol for Patients on Second-Generation Antipsychotics

Characteristic	Short Term				Long Term		
	Baseline	4 Weeks	8 Weeks	12 Weeks	Quarterly	Annually	Every 5 Years
Personal/family history	X					X	
Body mass index	X	X	X	X	X		
Waist circumference	X						
Blood pressure	X			X		X	
Fasting plasma glucose	X			X		X	
Fasting lipid profile	X			X		X	X

Note: * More frequent assessments might be warranted based on clinical status. American Diabetes Association; American Psychiatric Association; American Association of Clinical Endocrinologists; North American Association for the Study of Obesity. Consensus development conference on antipsychotic drugs and obesity and diabetes. Diabetes Care 2004;27:596–601. Reprinted with permission from the American Diabetes Association.

in persons with heart disease, history of syncope, or prolonged QTc interval. Similarly, the second-generation antipsychotic ziprasidone is contraindicated in persons with QTc-interval prolongation, underscoring the need for baseline and follow-up electrocardiograms before prescribing these agents.[2] Hyperprolactinemia is a potential side effect of first-generation antipsychotics and risperidone.[2] Although sexual side effects are most commonly considered as a possible complication of hyperprolactinemia, the potential increased risk of osteoporosis associated with prolonged treatment with conventional antipsychotics is of particular concern for the older person with SMI. For example, in a study of persons with schizophrenia receiving prolactin-raising antipsychotic medications for more than 10 years, 52% of the men and 32% of the women lost bone mineral density.[60] An association between risperidone and reduced bone mineral density in women with schizophrenia has also been reported.[61] Although a direct relationship between prolactin-elevating antipsychotic agents and osteoporosis remains controversial,[62,63] bone density screening in postmenopausal women and older men should be considered as an important component of health care for older persons with a history of prolonged antipsychotic exposure.[64] Finally, the importance of annual vision tests for older persons with SMI is especially critical for those treated with agents potentially associated with cataracts and lens opacities such as chlorpromazine and quetiapine.[2]

A FRAGMENTED SYSTEM OF CARE AND BARRIERS TO ACCESSING ADEQUATE MEDICAL CARE

Despite the clear linkage between physical health and mental health outcomes, psychiatric clinicians and mental health systems of care have failed to incorporate medical health care into the mainstream of clinical practice. The recent President's Commission on Mental Health identifies integration of mental health and medical health care across the life span as a priority, especially for the older person with psychiatric illness.[65] Physical illnesses are often undetected or inappropriately treated in individuals with psychiatric disorders.[42,66] Moreover, older adults with mental disorders are less likely to receive needed health care, leading to increased rates of mortality.[42]

Persons with SMI report a variety of barriers to medical care. For example, adult outpatients with schizophrenia and affective disorder most frequently report that they have difficulty accessing health care because of a lack of affordability of prescriptions (22.5% of respondents), poor timeliness of appointments (22.5%), lack of transportation (14%), and problems scheduling or getting themselves to doctors' appointments (12%–13.5%).[44] Fifty-nine percent of persons with SMI report at least one barrier to accessing medical care, compared with 19% without a psychiatric disorder.[44]

SMI is associated with disproportionately high general health expenditures,[67] in part due to accessing treatment through emergency departments and urgent care clinics where the cost of care is more expensive. For instance, healthcare expenditures of individuals with schizophrenia who are dually eligible for Medicare and Medicaid are higher than for those with depression or medical disorders.[68] These expenditures escalate with increasing age.[68]

USE AND QUALITY OF HEALTHCARE SERVICES FOR OLDER PERSONS WITH SMI

Older adults with SMI are at greater risk of receiving inadequate or inappropriate care, including lower quality of health care, inappropriate prescriptions, and reduced access to needed services.[69] Public sector outpatient services for older adults with SMI largely consist of visits for psychiatric medication check-ups, mental health care management, and services focusing on management of psychiatric symptoms.[70] Despite the added complexity of medical illness in the older person with SMI, they are likely to receive a lower intensity of health services. For example, a 12-month study of older Veterans Affairs patients with psychiatric disorders found that older persons ($\geq$65) received fewer healthcare services than younger adults (18–64).[71] Older persons with DM are less likely to receive more than one medical visit if they have schizophrenia, bipolar disorder, or posttraumatic stress disorder than individuals without SMI.[71] Patients with hypertension and any psychiatric disorder are less likely to receive more than one medical visit than persons without a mental illness.[71]

Older adults with SMI have a increased rate of mortality after acute medical events, most likely due to a lower likelihood of receiving appropriate and adequate acute health care. In an analysis of Medicare claims,[42] older adults ($\geq$65) with mental illness were found to receive poorer medical care after MI than older adults without a mental disorder. The presence of psychiatric illness was associated with a 19% increase in 1-year mortality. In the subgroup of patients who were eligible for procedures (but considered not to be ideal because of one or more contraindications), psychiatric illness was associated with poorer quality of health care after the MI. For example, patients with psychiatric illness had a lower likelihood of receiving reperfusion therapy (26% less), angiotensin-converting enzyme inhibitors (12% less), beta-blocker therapy (10% less), and aspirin therapy (9% less). Older patients with schizophrenia were 52% as likely as patients without a psychiatric illness to receive reperfusion therapy. After adjusting for these quality measures of post-MI care, the association between mental disorders and greater mortality after MI was no longer significant. These findings call attention to the possibility that deficits in quality of health care may explain a substantial part of the mortality experienced by older adults with SMI. This study does not address whether poorer quality of care was due to provider factors (e.g., physician discomfort or attitudes) or patient factors (e.g., patient reluctance to seek treatment or socioeconomic factors). Regardless of the mechanism, increased rates of early mortality, high rates of medical comorbidity, and evidence of inadequate and poorly coordinated health care suggest the critical need for integrating medical and psychiatric care to create a more comprehensive strategy for treating the older person with SMI.

MODELS OF INTEGRATED PSYCHIATRIC AND MEDICAL CARE FOR PATIENTS WITH SMI

A variety of models have been proposed to integrate psychiatric and medical care, ranging from single providers who are qualified to deliver both medical and psychiatric care, to linkage models that provide case managers or
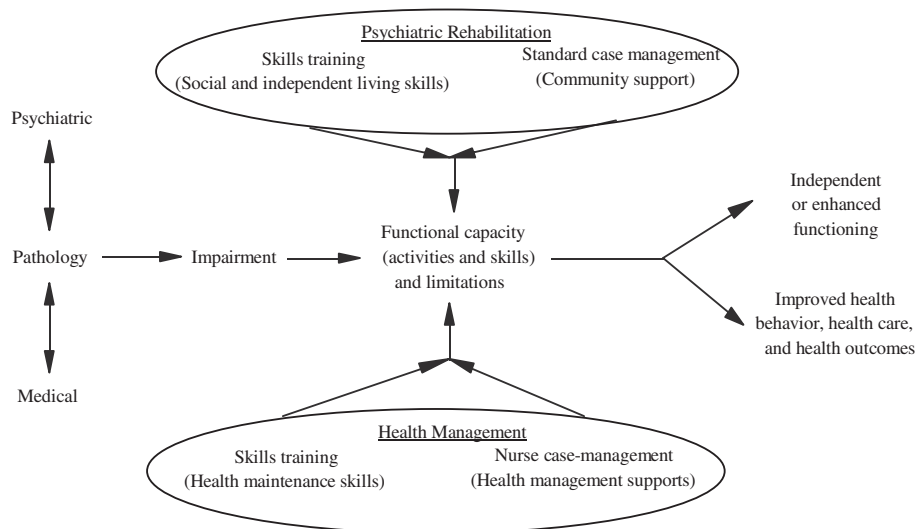
actively coordinate services across different sectors. One proposed solution is to promote the role of primary care physicians in providing psychiatric care for mentally ill patients[72] or, alternatively, to train psychiatrists to provide basic primary care to their patients with SMI.[73,74] Formal training programs have been developed to advance this approach to produce physicians who are dually board certified in psychiatry and family/internal medicine.[75,76] An alternative approach suggests that one of the roles of a mental health case manager is to act as a "culture broker," providing a linkage between the public mental health system and general health care.[77] More recently, it has been suggested that a medically trained nurse who provides care management for common medical disorders and active coordination of health care might better perform this function.[78] It is likely that the optimal model of integration depends on individual need and severity of illness. For example, primary care physicians commonly provide basic mental health care to older persons with mild or uncomplicated mental disorders. Similarly, psychiatrists are now taking a more active role in providing preventive health screening and treatment for early or mild medical problems. However, older persons who have SMI coupled with complex medical illnesses require intensive specialty psychiatric services and carefully coordinated primary and specialty medical care.

An example of a conceptual framework that matches medical and psychiatric level of need to service intensity is provided by the Four-Quadrant Clinical Integration Model.[79] As shown in Figure 1, this model describes four levels of mental and physical health care classified by the severity of disorders. Each quadrant considers the mental and physical health risk and complexity of the population and suggests the major system elements that would be used to meet the needs of the individuals within that subset of the population. In general, older persons with SMI are most appropriate for the quadrant in which there is both SMI and severe medical illness (Quadrant IV). This model assumes that high mental and physical health complexities and risks are optimally served in both the specialty mental health and primary care/medical specialty systems. Hence, the older person with SMI would have treatment coordinated by a mental health case manager who worked collaboratively with a medical disease manager. Alternatively, a single care manager with training in both medical and psychiatric care management could actively integrate services across both medical and mental health systems.

In an effort to minimize overlapping or duplicative care management functions, service models have been developed and tested that incorporate medical disease management into services for middle-aged persons with SMI who have medical comorbidity. For example, in a study of 120 male veterans with SMI (mean age 45), the researchers[78] evaluated an integrated care model consisting of a nurse practitioner providing medical care under supervision from a family practitioner. Services were provided in a medical clinic that was contiguous to a mental health clinic. Over the 1-year follow-up period, the integrated care model was associated with more patients receiving primary care visits (91.5% vs 72.1%) and fewer receiving medical emergency

Figure 1. The four-quadrant clinical integration model for severe mental illness. MH = mental health; PH = physical health; PCP = primary care provider; ER = emergency room; IP = inpatient; SNF = skilled nursing facility.
Adapted with permission from Mauer BJ. Behavioral Health/Primary Care Integration: The Four Quadrant Model and Evidence-Based Practices. Rockville, MD: National Council for Community Behavioral Healthcare, 2004.

Figure 2. Integrated model of psychiatric rehabilitation and health management for older persons with severe mental illness. Adapted with permission from Bartels SJ, Forester B, Mueser KT et al. Enhanced skills training and healthcare management for older persons with severe mental illness. Community Ment Health J 2004;40:75–90.

room visits (11.9% vs 26.2%).[78] Patients in the integrated care model also had better self-reported health status and lower costs at 12-month follow-up than patients receiving usual care.[78] This model promotes the importance of physical proximity of mental and medical health care combined with a dedicated nurse practitioner who can provide basic health care to individuals with SMI.

An alternative model does not require the colocation of medical and psychiatric clinics, but instead employs a community mental health nurse who is trained in psychiatric and medical care management.[80] This model is specifically designed for older persons with SMI and uses a nurse healthcare case manager to monitor, facilitate, and coordinate primary medical health care in education and illness management. As shown in Figure 2, this model is designed to simultaneously address psychiatric and medical needs through rehabilitation and healthcare management that enhances independent functioning and health outcomes. Psychiatric case management provides core community supports and coordinated mental health services. Skills training improves independent living skills, personal health maintenance, and positive health behaviors. A nurse specialist who coordinates health care and ensures the provision of preventive healthcare services provides medical care management. This integrated psychiatric rehabilitation and health management model links skills training and health management interventions to enhance independent functioning, health outcomes, and quality of life.[80]

A pilot study of this model consisting of 24 older persons (mean age 66.5, range 57.8–78.7) with SMI (66% schizophrenia) and comorbid medical illness (mean number of medical illnesses = 4.3) revealed high rates of preventive health care received by individuals who had not been receiving such care (e.g., recent dental, eye, gynecological, or blood pressure checks). Before the intervention, one-sixth of the patients did not have a designated physician, and nearly 30% had not received preventive health care in the prior year. After the intervention (2-year duration), all patients had a primary care physician and had received at least one physical examination. Four of the five patients who had not had regular eye examinations received prescriptions for glasses, and the three patients who lacked a recent dental examination saw a dentist. Undertreated medical disorders or new diseases were detected in approximately one-third of the sample, including gall bladder disease, hypothyroidism, cellulitis, esophageal web, and ischemic heart disease. Finally, the individuals who were treated via the integrated care model acquired improved health self-management skills.[80] Based on the promising results of this pilot, a multisite randomized services trial is underway comparing outcomes of this healthcare management and skills training model with usual care for older persons (≥50) with SMI.[81]

SUMMARY

High rates of comorbid medical illness in older persons with SMI are associated with multiple factors, including lifestyle and health behaviors associated with SMI, health-related side effects of antipsychotic medications, barriers to health care, and poorer quality of health care. Medical illness in older persons with SMI is associated with early mortality, disability, reduced functioning, and greater rates of nursing home placement and high-cost emergency services. It is incumbent upon psychiatrists and other mental health providers caring for older adults with major psychiatric illness to be proactive in ensuring screening, monitoring, and treatment of medical illnesses. Consistent with reports from the recent President's Commission on Mental Health,[65,82] future models of care should consist of integrated mental health and physical healthcare services. Finally, health policy reforms are needed to support mechanisms and billing codes under Medicare and Medicaid that encourage disease management, health promotion, and the integration of psychiatric and health services for older persons with SMI and comorbid medical illness.

ACKNOWLEDGMENTS

The author is solely responsible for the study concept, design, acquisition of subjects and data, analysis and interpretation of data, and preparation of this article.

The sponsor of this article was not involved in the design, methods, subject recruitment, data collection, analysis, or preparation of this article.

The author acknowledges the invaluable assistance of Aricca Van Critters in preparing this manuscript.

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