

## Chapter 2

# Prevalence of Psychiatric Symptoms/ Syndromes in Medical Settings

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**Abstract** Mental health and substance use disorders, or behavioral health (BH) disorders, are common and associated with significant morbidity, disability, and health-care costs. However, BH services are not adequate to meet this need. BH care in the general medical sector has increased substantially in the last decade. However, such care tends to lack adequate evidence-based mental health treatment despite a growing evidence base. Moreover, behavioral and medical conditions tend to co-occur, and thus, patients with combined needs are often seen in medical settings. BH and medical conditions are risk factors for one another, and each complicates the course and treatment of the other. Based on these observations, it is essential that we integrate mental health and medical care delivery to improve access, care, and reduce cost.

## Introduction

Globally, mental health problems are highly prevalent and associated with dramatically impaired quality of life, increased mortality, substantial cost, and impeded development. Major depression is presently the fourth leading cause of disability worldwide. By 2020, it is expected to be the leading cause of disability as measured by disability-adjusted life years [1]. BH and musculoskeletal disorders, such as chronic back and neck pain, were the largest contributors to years lived with disability across all age groups in the USA in 2010 [2]. The top 20 disorders that confer

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the most years lived with disability in 2010 include seven BH disorders: major depression, anxiety disorders, drug use disorders, alcohol use disorders, schizophrenia, bipolar disorder, and dysthymia [2].

In the USA, nearly half of the population will develop a BH condition during their lifetime [3]. BH sector services are inadequate to meet this substantial need. In fact, 96 % of US counties lack sufficient numbers of psychiatrists or psychiatric nurse practitioners, making BH care in the medical setting a necessity [4]. Hence, some have argued that primary care is the de facto mental health and substance use service for 70 % of the population [5]. While the number of general medical practitioners providing BH care has increased substantially in the last decade, evidence-based BH treatment is the exception rather than the rule. Care in the medical sector includes fewer visits, less evidence-based treatment, and a preponderance of pharmacotherapy, with a notable absence of proven psychotherapeutic and psychosocial strategies. Yet many patients prefer to receive BH care in the general medical environment, despite the current challenges in the quality of such care.

Among adults with medical conditions, 29 % also have a BH condition. On the other hand, among those with BH conditions, 68 % also have comorbid medical conditions [6, 7]. BH and medical conditions serve as potent interacting risk factors, complicating the development, course, and treatment of each other. While patients with BH conditions are seen frequently in the medical setting, their BH needs often go largely unmet, which contributes to overall poor health [6].

This chapter provides an introduction to the significant prevalence of BH conditions in medical settings such as primary care and the general hospital inpatient setting; it then reviews such comorbidity among particular illnesses by organ system.

## **BH Comorbidity by Service Location**

### ***Primary Care***

BH conditions are common and have substantial impact on medical outcomes in primary care. Patients are most likely to be diagnosed and treated for BH conditions in primary care settings; such patients also typically have one or more chronic medical condition. Moreover, the course and management of medical conditions involve health behaviors and psychosocial factors, underlining the impact of BH. A comparison of the prevalence for common disorders in the general population and in primary care is presented in Table 2.1 [8–15].

Major depressive disorder (MDD) has a lifetime prevalence rate of approximately 13 % and 1 year prevalence of 5–7 % [3]. In primary care clinical settings, annual prevalence of MDD ranges from 5 to 13 % in adults and 6–9 % in the elderly. More than half of people seeking help for BH problems never see a BH specialty provider; often they seek care from primary care providers. Although the majority

**Table 2.1**    Prevalence of common mental health disorders in primary care settings

Disorder	Prevalence in general population (%) [2]	Prevalence in primary care settings (%) [9–16]
Depression	13.2	5–20.7
Dysthymia	1.5	2–12.6
GAD	5–6	10.3
Panic disorder	1.1–3	2.8
OCD	2	0.14
PTSD	6.8	12
Social phobia	13.2	3.6
Specific phobia	12.5	4.4
Bipolar	1.5	0.5
Schizophrenia	0.7	0.9
Substance use disorders	27	16–20
Eating disorders	0.3–1	2.3–2.8
Somatoform disorders	4.9–21	7.6–39.4

of patients receiving care for depression are in primary care settings, many cases of depression are not detected by primary care providers. In a 1995 HMO-based study, clinicians recognized only two-thirds of patients with MDD. Missed cases were more likely to be younger and to have less severe depression. Rates of detection increase when systematic screening and integrated primary care–mental health programs were implemented [16]. Interestingly, the large majority of antidepressant prescriptions are written by primary care physicians, though such prescribing is often for patients that don’t actually have a diagnosed BH disorder.

The prevalence of MDD among older adults is lower than that of younger adults; however, severity may be greater in older adults, who have the highest risk of suicide among age groups. Fifty to seventy-five percent of those who complete suicide have seen their primary care doctor within the past month, and 39 % had been seen by a doctor within 1 week of their death [17]. Depression is twice as common in women as it is in men. Other demographic groups at high risk of depression are those with chronic medical diseases, comorbid substance use disorders or other psychiatric diagnoses, and people who are either unemployed or have lower socioeconomic status.

In primary care settings, where half of adults receiving treatment for MDD are managed, the severity of depressive symptoms is equivalent to patients receiving care in specialty mental health-care settings. For example, in one survey of patients receiving depression care in primary care settings, 43 % reported having experienced suicidal ideation in the past week [18]. Thus, patients seen in primary care are as affected as those in the BH sector. The prevalence of depression in various medical settings is presented in Table 2.2 [3, 12–14, 19–26].

Dysthymia, characterized by persistent low-grade depressive symptoms, is less common than MDD, with a 12-month prevalence in community-based adult samples of 1.5–1.6 % [3]. In primary care settings, prevalence of dysthymia is estimated to be 2–4 %, though sub-threshold depressive diagnoses are notoriously difficult to

**Table 2.2** Prevalence of depression in medical settings

Disorder	Prevalence (%)	Reference
General population	6.7	[3]
Primary care	5–20.7	[12–14]
Emergency room	7	[27]
General hospital	26	[19]
Cardiology outpatient	12–23	[20]
Cardiology inpatient	16–20	[20]
Endocrine outpatient	12–18	[21, 22]
HIV outpatient	16.2–36	[23, 24]
Oncology outpatient	16.3	[25]
Neurology inpatient, post-CVA	20	[26]

screen for and, therefore, may not be accurately estimated in clinical or community populations. More broadly defined, sub-threshold depressive disorders have been detected in primary care settings in 16 % of adults and 10 % of older adults [28].

Anxiety disorders are the most common psychiatric illnesses in the US general population. They affect 15–20 % of patients attending medical clinics. Because a number of medical conditions may present with anxiety, and anxiety disorders are associated with a number of somatic symptoms, it is important to evaluate patients with anxiety for underlying or comorbid medical conditions or medication side effects. Even though anxiety disorders are exceedingly common in the general population, only 7 % of those with anxiety disorders are noted to have them by their primary care providers [29]. These low detection rates are attributable to many factors, including brevity of office visits, lack of education received by primary care providers, poor screening procedures, unwillingness to label a patient with a BH condition, and frequent presentation of anxiety symptoms as primarily somatic complaints. However, one-third of patients presenting with somatic complaints to their primary care provider have an anxiety or depressive disorder [28]. Thus, it is essential for medical providers to consider these common BH disorders in order to avoid costly, potentially harmful and unnecessary medical work-ups.

Generalized anxiety disorder (GAD) affects 5–6 % of the population and is highly comorbid with other psychiatric illnesses; 80 % of patients with GAD also meet diagnostic criteria for major depressive disorder, dysthymia, phobias, or substance use disorders. GAD is also highly comorbid with medical illnesses, including chronic pain, irritable bowel syndrome, cancer, asthma, and cardiovascular disease [29]. Careful clinical diagnostic assessment and symptom management might prevent excessive testing and specialty referrals.

Social and specific phobias are common, affecting 13.2 and 12.5 % of the population, respectively [3]. Social phobia typically begins in childhood or adolescence, and significantly affects relationships and school and work performance. In spite of profoundly impacted function across multiple domains, only 27 % of sufferers seek treatment for social phobia. Health-care-seeking behavior is even lower among people with specific phobias. Eight percent of patients seek health care for specific phobias; a lower rate than for any other anxiety or mood disorder.

While panic attacks are common with a lifetime prevalence of 23 %, panic disorder (PD) without agoraphobia affects 3.7 % of community members and with agoraphobia only 1.1 %. Though not as common as depression or GAD, panic attacks and panic disorder account for a larger amounts of total health-care service utilization and are associated with functional impairment. Nearly 85 % of patients with PD and 96 % with PD and agoraphobia seek treatment for their symptoms [30]. However, 70–80 % of treatment occurs in primary care settings with no specialty mental health-care involvement [30]. In a large Canadian epidemiologic survey, health-care-seeking behavior was higher in PD patients than patients with other forms of anxiety or those with mood disorder [31].

Obsessive-compulsive disorder (OCD) has a lifetime prevalence of 2 %. The average time from onset to diagnosis is 11 years [32]. In spite of symptom under-reporting, OCD is intensely distressing and is a strong risk factor for suicide. More than half of people with OCD experience suicidal ideation and 15 % attempt suicide. It is not entirely clear how many patients with OCD are seen in the primary care setting, but given the long time prior to diagnosis, it is likely substantial but goes unrecognized.

Post-traumatic stress disorder (PTSD) affects 6.8 % of the population and nearly one in five veterans [3, 9]. Between 12 and 25 % of patients seen in primary care settings have PTSD. Overall utilization of health care is high among this population, with higher visit frequency and doubled health-care costs [33]. Civilians and veterans with PTSD experience higher rates of chronic pain, irritable bowel syndrome, fibromyalgia, and arthritis. Studies of veterans with PTSD also reveal increased relative risk for cardiovascular, gastrointestinal, endocrine, respiratory, and autoimmune diseases.

Bipolar disorder affects 1.5 % of the general population. Though commonly believed to be best managed in the BH sector, prescription data from patients with bipolar disorder reveal that a significant proportion of mood stabilizer and antipsychotic prescriptions are generated by primary care providers, and such prescriptions are consistent with the chronic management of bipolar disorder. A recent cross-sectional study in the UK revealed that among patients with serious mental illness (defined as schizophrenia or bipolar disorder), 31 % had been seen only in primary care settings over the past 12 months. In this sample, 56.3 % had a diagnosis of schizophrenia and 37.7 % had bipolar disorder [34]. Schizophrenia affects nearly 1 % of the population, and is associated with high rates of medical comorbidity. In the USA, adults with serious mental illness die 25 years earlier than do adults in the general population, largely secondary to cardiovascular disease and complications of diabetes, indicating that this population has tremendous medical need and dramatic disparity with respect to access to and quality of primary medical care [35].

In primary care settings, the prevalence of somatoform disorders is roughly 10 %, although the diagnosis is rarely made by primary care physicians [10]. At least one-third of patients suffering from somatoform disorders have comorbid mood or anxiety disorders. Health-care utilization and costs are markedly elevated in patients with somatoform disorders, with or without comorbid mood or anxiety disorders.

Substance use disorders have a lifetime prevalence of 27 %. Alcohol use disorders are particularly frequent, and rank second only to hypertension in terms of disease prevalence in the US adult population. International studies have shown that 20–30 % of patients presenting to primary care have hazardous, i.e., a repeated pattern of drinking that increases the risk of physical or psychological problems, or harmful drinking, i.e., evidence of such drinking-related problems [11].

Prescription drug abuse was measured to occur in over 570,000 US citizens in 2001–2002, yet less the 15 % of abusing individuals participate in specialty substance abuse treatment [36]. Opioid addiction is four times more likely in the primary care chronic pain population. Over 80 % of such patients report at least one drug-related aberrant behavior, which is a strong predictor of addiction [38]. In pain clinics, opioid addiction is estimated to be 2–5 %, opioid abuse 20 % and occasional aberrant misuse of opioids even more common.

## *Emergency Departments*

With the Community Mental Health Act in the 1960s, community BH agencies were established to provide psychiatric care largely in place of long-term hospitalization. Most communities were, and continue to be, ill-equipped to provide BH services. As such, emergency departments (EDs) have often become the primary portal of entry for BH care. With federal, state, and local budget cuts as well as managed care companies' restrictions, access to BH care services has become even more limited. Care has increasingly been driven to EDs and provided only when patients are in crisis. With limited access to outpatient BH services and pervasive poverty and comorbid substance use disorders, patients with mental illness tend to be relatively high utilizers of ED services, whether or not the presenting complaint is psychiatric in nature. Screening of all ED patients revealed that 44.7 % met DSM-IV criteria for current or past psychiatric disorder with major depressive disorder most heavily represented at 7 % [38].

Aside from acute exacerbations of chronic mental illnesses such as schizophrenia, bipolar disorder, and major depressive disorder, suicidality and substance use disorders are commonly encountered in EDs. According to the NHAMCS ED database, over a 16-year study period (1993–2008), there was an average of 420,000 annual ED visits for suicide attempt or self-inflicted injury. Further, during this study period the average number of ED visits for suicide attempt per year nearly doubled [39]. Of all attempted suicide attempt and self-injury visits in this study, one-third of patients had documented mental health diagnoses. Suicidal ideation is common among patients presenting to EDs for any reason. One study found that 13 % of ED patients not presenting with psychiatric complaints or suicidality endorsed suicidal ideation upon screening [40, 41].

Physical and psychiatric sequelae of alcohol use are extremely common in the ED, and due to the breadth of presentations, including trauma and injuries, hepatitis, pancreatitis, withdrawal, seizures, and psychiatric symptoms it is difficult to

estimate the overall proportion of ED visits related to alcohol use. A German study found that 30 % of patients evaluated by psychiatrists in the ED were diagnosed with alcohol related disorders [42]. A 1-year systematic evaluation of consecutive adult ED patients presenting for medical complaints in Michigan showed that 15 % met DSM-IV criteria for either abuse (6.7 %) or dependence on (8.3 %) alcohol or illicit drugs [43]. In a Canadian study of ED resource use, 11 % of patients had documented substance use disorders, and 8.6 % of visits were attributed directly to substance-related problems. Furthermore, the medical inpatient admission rate for substance-related visits was 25.3 %, significantly higher than overall admission rates of 17.6 % ( $p < 0.001$ ) [44].

## ***General Hospital Inpatient***

BH diagnoses make up a significant proportion of all hospital admissions nationally, with 17.9 % of all discharges having a BH disorder coded as a secondary condition [45]. Psychiatric comorbidity is common among medical inpatients, with 20–40 % meeting criteria for a DSM-IV diagnosis [46]. The most common diagnoses are depression, anxiety, substance abuse, delirium, and dementia. Using a structured interview, the prevalence of depression was found to be as high as 26 % in one study of medical inpatients [19], while suicidal ideation was found in 7.2 % in another study [47].

Patients with BH diagnoses are more likely to be high utilizers of the health system, to be readmitted and to have longer lengths of stay in the hospital. Thus, patients with BH conditions are seen frequently in the general medical hospital. Individuals with major depression were nearly three times more likely to be rehospitalized within 90 days compared to other patients in one study [48], while patients with schizophrenia had an OR of 2.63 (95 % CI: 1.13–6.13) for a potentially avoidable readmission in another study [49].

Patients with BH problems are not only likely to present for admission to the hospital, but may develop conditions while in the hospital in response to their medical illness. For example, 30 % of patients met criteria for PTSD after a myocardial infarction, while 18.2 % met criteria for PTSD 6 months after cardiac surgery. More traumatic illness generally leads to higher rates of PTSD; up to 45 % of burn unit patients meet criteria for PTSD. Moreover, comorbid PTSD and depression among medical patients is associated with higher health-care utilization [50].

Alcohol-related disorders impact between 12.5 and 30 % of patients in the general hospital. In one study using systematic screening and case validation in a general hospital, 30 % of men and 8 % of women met criteria for alcohol abuse or dependence, yet alcohol was noted to be a problem by the admitting team among only 18 % of patients [51]. Even though the American College of Surgery mandated in 2007 that all Level I trauma centers screen for alcohol use disorders and provide at least a brief intervention in the hospital, the majority (72.4 %) of centers screen patients using only laboratory tests which may be falsely negative by the time of

**Table 2.3** Prevalence of delirium in medical settings

Disorder	Prevalence (%)	Reference
Emergency room	8–10	[54]
General hospital, on admission <sup>a</sup>	11–25	[54, 55]
General hospital, incident delirium <sup>a</sup>	30	[54]
Oncology inpatient	25–30	[56]
Neurology inpatient, post CVA	30–40	[26]
Postoperative, cardiac <sup>a</sup>	42	[57]
Postoperative elective hip arthroplasty <sup>a</sup>	22	[58]
Surgical and trauma intensive care unit	69	[54]
Intensive care unit, ventilated	50–80	[54]

<sup>a</sup>Sample of elderly patients

admission, as opposed to evidenced based screening instruments such as the CAGE questionnaire [52].

Hospitalizations for drug abuse comprised 3.3 % of all admissions in 2005 and such patients tend to stay in the hospital on average 1 day longer than other patients [53]. Admissions related to cocaine were most common at 35.1 %, with opiate-related admissions accounting for 26 % of admissions.

Delirium is extremely common in the general hospital, particularly amongst the elderly and those with prior cognitive impairment. The prevalence of delirium across medical settings is presented in Table 2.3 [26, 54–58]. One study examined a hospital-wide sample of non-ICU patients and found an overall hospital prevalence of 20 % for inpatients. As many as half of the patients on the geriatric units had delirium, and about 25 % of general medical patients met criteria [55]. Approximately 11–25 % of elders are admitted with delirium, while an additional 30 % develop delirium in the hospital [54]. Postoperative delirium risk increases with the risk and length of the surgery. Abdominal and cardiac surgeries are associated with a rate of approximately 50 % of postoperative delirium [54].

### ***Intensive Care Units***

The most common disorder encounter in the intensive care setting is delirium. Delirium occurs in 31 % of all Intensive Care Unit (ICU) admissions and has a cumulative incidence of 81 % over the course of the ICU stay [54]. Delirium is associated with increase ICU and hospital length of stay, functional and cognitive decline and increased mortality.

Critical illness is by definition, a life threatening event that is potentially traumatizing. Patients often report feeling fearful during and after ICU care. A review of PTSD symptoms following treatment in an ICU found a median point prevalence of questionnaire-ascertained PTSD of 22 %, while the median point prevalence of clinician-diagnosed PTSD was 19 %. Higher number of ICU days appears to be a



risk factor for PTSD, while illness severity has not been found to be a consistent predictor [59].

Acute lung injury (ALI), which includes acute respiratory distress syndrome, is associated with an increased risk for depression, PTSD and anxiety after ICU care. All are associated with decreased health-related quality of life. A systematic review found that at discharge, 44 % of ALI patients met criteria for PTSD by diagnostic interview. Symptoms tended to persist with 25 % still meeting criteria 5 years post discharge. Clinically significant depressive symptoms were found to have a median prevalence of 28 %, while anxiety symptoms were found among 24 % of patients [60].

## **BH Comorbidity by Organ System**

Review of the prevalence of BH conditions by treatment setting reveals high rates of such conditions, including those with substantial severity. In a similar vein, examination of BH conditions occurring among patients with particular medical illness shows substantial comorbidity. This section is organized by organ systems and highlights some of the more common medical illness and associated BH conditions.

### ***Neurology***

Neurological symptoms without diagnosable neurologic cause are present in up to one third of all patients presenting to neurology clinics [61]. This includes symptoms such as weakness, pain and symptoms largely disproportionate to an underlying disease. One study of consecutive new patients referred for neurology consultation, revealed that 44 % of outpatients and 20.5 % of inpatients met criteria for a DSM-IV somatoform disorder [62]. Undifferentiated somatoform disorder was the most common at 17.5 %, followed by pain disorder (11.6 %). While somatization disorder was diagnosed in only 1.1 % of patients, somatoform NOS was found in 7.1 %. Lastly, conversion disorder was seen in 2.9 % of patients.

### **Epilepsy**

Approximately half of all patients with seizures have psychiatric symptoms and syndromes. Complex partial seizures are the most common form seen in adults and frequently present with psychiatric symptoms including affective, perceptual behavioral or cognitive symptoms. Interictally, patients with epilepsy have been found to have high rates of panic attacks 20 %. Approximately 8–10 % of epilepsy

patients have postictal symptoms ranging from mood disturbance to psychosis [26]. These symptoms are generally short-lived but may be a focus of clinical attention.

Depression assessed by the PHQ-9, was found in 29.3 % of patients presenting to an epilepsy clinic. Patients with well-controlled seizures tended to have lower depression scores than those with persistent seizures [63]. Overall, depression and suicide have been shown to be 4–5 times greater among patients with epilepsy than in the general population [26]. Non-epileptic seizures (NES), also called psychogenic seizures or pseudoseizures, are common, representing 10–30 % of neurology outpatients in epilepsy clinics [64] and 20 % of patients referred to epilepsy monitoring units. About 25 % of patients with NES also have epileptic seizure disorders. Thus, such patients are frequently seen in the neurology setting.

### **Cerebrovascular Disease**

Psychiatric symptoms and syndromes are seen in at least half of all patients after stroke. Delirium is prevalent post-stroke, impacting 30–40 % of patients in the acute post-stroke period. Dementia may be diagnosed in approximately 25 % of patients in the 3-month period after stroke [26, 64].

Approximately 20 % of patients meet criteria for major depression in the acute post-stroke period, an additional 20 % meet criteria for minor depression [26]. The prevalence of depression is highest in acute hospital and rehabilitation settings, and declines among patients living in the community to between 10 and 15 %. Vascular depression comprises executive dysfunction, more frequent and severe T-2 weighted hyperintensities on brain MRI, tends to be of late onset and poorly responsive to antidepressants. Less is known about its prevalence, but it is thought to be significant among patients with late life depression associated with cognitive deficits and is refractory to treatment.

Generalized anxiety is frequently comorbid with depression in the acute post-stroke period, though symptoms may be more short lived than the 6-month duration required by DSM-5 criteria. The prevalence of significant anxiety symptoms by self-rating scales is 25–30 %. Post-stroke mania and psychosis are less common, each affecting approximately 1–2 % of patients in the acute period [26]. Pseudobulbar affect, characterized by spells of laughing or crying, is seen in approximately 15 % of post-stroke patients and is often a reason for psychiatric consultation [65].

### **Movement Disorders**

Hallucinations and delusions occur in up to 57–76 % of patients with dementia with Lewy bodies, 54 % of patients with Parkinson's disease and dementia, and 7–14 % of patients with Parkinson's disease without dementia [66]. Depression is seen in about 40–50 % of patients with Parkinson's disease and is one of the major determinants of quality of life; anxiety can also be a common symptom [67]. Early Parkinson's disease may be mistaken for depression given the overlap in clinical features.

In one study of 1,449 outpatients with Parkinson's disease, only 29.4 % were free from psychiatric symptoms, whereas 49.6 % had depression and/or dementia in some combination. Thirty-one percent had various symptoms such as illusions, hallucinations, delusions, and anxiety that did not meet criteria for a specific disorder [68].

## **Multiple Sclerosis**

Multiple sclerosis (MS) affects approximately 350,000 people in the USA. Sub-cortical cognitive impairment impacts at least half of all patients with MS and is manifested as decreased speed of processing, executive dysfunction and memory problems. More than half of patients with MS report depressive symptoms, which can be difficult to distinguish from the fatigue and pain often seen in the illness [69]. The lifetime prevalence of a major depressive episode is 50 % in MS [70].

## **Traumatic Brain Injury**

Traumatic brain injury (TBI) may be characterized by cognitive deficits, personality changes, mood and anxiety disorders and psychosis. A history of alcohol use disorders complicates the presentation in 40–50 % of patients with TBI. As many as 23 % of TBI patients meet the criteria for personality disorder. Depression in patients with TBI can be as high as 77 % among those with more severe injuries [71]. Up to 15 % of patients with TBI attempt suicide during a 5-year follow-up post-injury [26]. TBI and PTSD often co-occur, with rates of PTSD ranging from 15 to 44 % among civilians versus more severely injured veterans with TBI, respectively.

## **Headache**

Lifetime prevalence for MDD among migraine patients is 34 %, while for bipolar disorder is it 9 %. Migraine patients are 3–4 times more likely to have panic disorder and GAD, with lifetime prevalence rates of at least 11 and 10 %, respectively [69]. Given high rates of comorbid psychiatric disorders, routine BH screening in headache clinics is now recommended by some headache experts [72].

## **Cardiac**

Among outpatients with known coronary artery disease (CAD), 12–23 % of patients meet criteria for MDD [20]. Similarly, among survivors of acute myocardial infarction (MI), 16–20 % meet diagnostic criteria for MDD, which is at least three times

the rate in the general community. Furthermore, up to 45 % have significant depressive symptoms, as measured by the Beck Depression Inventory (BDI) [20]. Interestingly, not all depression following an MI is incident depression; approximately 55 % of episodes have onset prior to the cardiac event [73]. Somatic symptoms appear to be more prominent in post-MI patients compared to those seen in BH settings who tend to have more prominent cognitive and affective symptoms [74]. Less is known about the long-term course of depression post MI, but some studies suggest that it tends to follow a chronic course during the first year [20].

Depressive symptoms are also prevalent after coronary bypass grafting (CABG). A study using the Diagnostic Interview Schedule found that 20 % of 309 CABG patients met criteria for MDD [75]. About 40 % of patients also have significant symptoms of anxiety prior to and following CABG [76]. In patients with congestive heart failure, the prevalence of MDD assessed by diagnostic interview is 19.3 %, while clinically significant symptoms by self-rating questionnaires are found in 33.6 % of patients [77].

Because depression is highly prevalent, is associated with decreased adherence to medications and rehabilitation, and has been shown to have a substantial increase in cardiovascular morbidity and mortality, the AHA Science Advisory has recommended routine screening among cardiac patients [78]. Screening using the two-step method of Patient Health Questionnaire in cardiology settings yields a prevalence of 18 % positive depression screens, a sensitivity of 91 % and specificity of 55 % compared to a structured interview. Interestingly, this brief self-rated screening provides valuable prognostic information: after adjustment for age, sex, body mass index, history of myocardial infarction, hypertension, diabetes, heart failure, and high-density lipoprotein levels, screening positive for depression was associated with a 41 % greater rate of cardiovascular events over a mean of approximately 6 years of follow-up [79].

While depression has been most well-studied, other psychiatric diagnoses are also more prevalent among patients with CAD. Systematic diagnostic assessment of 100 stable outpatients with CAD revealed a mean number of comorbid psychiatric disorders per subject of 1.7. Point-prevalence of current disorders outside of depression included: dysthymic disorder (15 %), alcohol abuse (19 %), PTSD (29 %), generalized anxiety disorder (24 %), binge-eating disorder (10 %), and primary insomnia (13 %) [80].

At least 20 % of patients seen in an emergency department for chest pain meet criteria for panic disorder, while approximately half of patients presenting to primary care for chest pain have either panic attacks or the full disorder [76]. Patients with true CAD have elevated rates of comorbid panic disorder as well, with rates that are about four times that of the general population.

Symptoms of both anxiety and depression are common among patients prior to and after Implantable Cardiac Defibrillator (ICD) placement. The few studies that have used structured diagnostic interview, found that between 11 and 28 % of patients met criteria for depressive disorder and 11–26 % had an anxiety disorder. Rates of elevated symptoms of anxiety and depression based on self-report

questionnaires shows significant symptoms that tend to persist and are present even 12 months post-implantation. Elevated anxiety and depression scores on the Hospital Anxiety Depression Scale (HADS) are found in 27–26 % and 23–36 % of patients pre-implantation, 15–20 % and 23–25 % during the first 6 months post-procedure and 13–33 % and 7–32 % of patients followed 1 year or more after device placement, respectively [81].

Delirium is common in patients hospitalized for MI, CHF and CABG. Post-MI delirium rates are about 20 %, while 20–25 % of patients meet criteria for delirium postoperatively [57]. Rates of delirium are elevated in cardiac intensive care settings, patients requiring intra-aortic balloon pump therapy present with delirium 34 % of the time [76], for example.

## ***Oncology***

A systematic review of mostly European studies, found a combined prevalence of 32 % for any current non-psychotic BH disorder diagnosed by structured clinical interview among inpatients receiving cancer care [82]. Another review that included 70 studies in non-palliative care settings and used DSM and ICD criteria, found the prevalence of depression to be 16.3 %. Prevalence for dysthymia was 2.7 %, for anxiety disorders 10.3 %, and for adjustment disorder 19.4 % [25].

A study of 1,529 patients undergoing active outpatient treatment for cancer, found elevated Hospital Anxiety and Depression Scale (HADS) scores compared to 237 controls from the general population. Among cancer patients, 20.6 % reported significant anxiety consistent with an anxiety disorder versus only 5.9 % in the general population, 18.1 % reported significant depressive symptoms compared to 8.0 % in the control group [83]. A study of 2,297 outpatients with a variety of cancers at various stages showed that while 36.4 % had symptoms suggesting psychiatric morbidity, only 29 % of these patients were identified by their treating oncologist as distressed [84].

Depressive symptoms may be due to stress from the diagnosis of cancer, underlying medical illness, treatment side effects or represent a preexisting vulnerability to an affective disorder. Careful differential diagnosis including evaluation for hypoactive delirium, cancer-related fatigue, and anorexia is often warranted. In random samples of hospitalized cancer patients, reported rates of depressive symptoms vary from 25 to 50 % [85]. Factors associated with greater prevalence of depression are pain, a higher level of physical disability, and more severe illness.

The prevalence of depression varies by period of assessment and instruments used. Studies show that approximately 25 % of patients will require evaluation and treatment at some point due to depressive symptoms. About half of all cases of depression after cancer diagnosis occur in patients with a prior history of MDD [86]. About 20 % of patients diagnosed with non-small-cell lung cancer have depressed

mood at the time of diagnosis, and this tends to persist even after treatment [56]. Depression preceding the diagnosis of pancreatic cancer has been noted, and there has been consideration of depression as a risk factor for pancreatic cancer. Cross-sectionally, 38 % of patients with pancreatic cancer have elevated Beck Depression Inventory Scores (BDI) [56]. Overall depression is associated with poorer quality of life, decreased adherence to treatment, longer length of stay in the hospital and increased rate of suicide among patients with cancer [87].

Anxiety symptoms are common during initial evaluation given the stress, uncertainty, and difficult decisions that patients often have to make. They are also common when treatment is started or changed, or when waiting for information related to disease progression and staging. Anxiety may also be related to undertreated pain, and the experience of pain may be worsened by anxiety.

Most studies indicate that rates of anxiety disorders appear close to the normal population, though the brain tumor population may have elevated rates [56]. One large study of brain tumor patients revealed 48 % of patients met criteria for GAD; some of these subjects made up the group that met criteria for both depression and GAD, which represented 33 % of the sample [88]. Selected phobic disorders can interfere with medical evaluation and treatment, such as claustrophobia leading to difficulty tolerating MRI scans or health-related phobias such as needle phobia.

Less is known about the prevalence of anxiety disorders among longer term survivors of cancer. The National Comorbidity Survey Replication provided an opportunity to examine subjects reporting a history of cancer with no recurrence for 5 years [89]. Subjects with a history of cancer, were more likely to have any anxiety disorder (OR: 1.49, 95 % CI: 1.04–2.13) during the past 12 months, though rates for social anxiety, GAD, PTSD, and panic disorder were not significantly different. Odds for specific (OR: 1.59, 95 % CI: 1.06–2.44) and medical phobia (OR: 3.45, 95 % CI: 1.15–10.0) were significantly elevated amongst cancer survivors, however.

Cancer and its treatment can be traumatic and can lead to PTSD-spectrum symptoms for some patients. For example, 24 % of women 2 years after a diagnosis of breast cancer were found to have symptoms of PTSD, whereas only 9 % met criteria for the disorder [90]. Younger women, and those with lower education and income appear more likely to have significant PTSD symptoms [56]. Neuropathic symptoms can also be a reminder of treatment and activate anxiety, intrusive thoughts and avoidance [90].

Fatigue is extremely common among cancer patients and may be virtually a universal experience at least transiently. Fatigue may become a focus of attention for a psychiatrist given the related impairment in function and quality of life. The National Cancer Centers Network (NCCN) recommends systematic assessment for fatigue in a similar manner to assessing pain, followed by investigation of contributing causes including anxiety, depression and sleep disturbances [56]. Finally, delirium is common in cancer patients, with 25 to 30 % of inpatients meeting criteria for delirium. In terminal stages of illness, delirium prevalence reaches up to 85 % [56, 87].

## ***Infectious Diseases***

### **HIV–AIDS**

Mental illnesses are common among people living with HIV/AIDS (PLWHA). The relationships between BH disorders and HIV are complex because baseline BH disorders confer risk for contracting HIV due to increased risk behaviors.

Of the BH illnesses experienced by PLWHA, depression prevalence ranges from approximately 20–36 % depending on evaluation method used [23]. Depression profoundly impacts HIV in many ways, with behavioral and biologic factors affecting combined antiretroviral therapy adherence, high risk sexual behavior, virologic failure, and mortality [24].

Anxiety symptoms, including dyspnea, tremor, palpitations, nausea, and diarrhea, are also common among PLWHA and may be attributable to medication side effects, illness or a primary disorder. GAD and PD have 12-month prevalence of 16 and 10 %, respectively [23]. Careful evaluation for both medical and psychiatric etiologies of mood and anxiety symptoms is warranted. Substance use disorder prevalence among PLWHA is more than 25 %, as would be expected given that IV drug use is the second most common HIV transmission risk factor. Drug and alcohol abuse is associated with increased high-risk sexual behaviors. Half of PLWHA who have a substance use disorder also meet criteria for a comorbid psychiatric diagnosis, most commonly major depressive disorder followed by panic disorder and bipolar disorder [23].

The rate of suicide completion among PLWHA in Switzerland is three times that of the general population. In the USA, one in five HIV-positive patients report having had suicidal ideation in the previous week [91]. Many factors contribute to this phenomenon, including highly prevalent comorbid depression, substance use disorders, social isolation, stigma, and chronic pain and fatigue associated with the disease.

### **Hepatitis C**

BH disorders are common among those who have Hepatitis C Virus (HCV) infection. The occurrence of HCV infection is reported to be up to 11 times greater in people with serious BH disorders compared to the general population, and as high as 25 % in some study samples of patients with serious mental illness [92]. HCV infection was documented among almost 2 % of all hospitalizations in the VA system, 62 % of these patients also had discharge diagnoses of comorbid substance use and other BH disorders such as depression, PTSD, bipolar disorder, and psychosis [92]. Interferon has been the mainstay of treatment for HCV but causes neuropsychiatric side effects such as depression, irritability and anxiety in approximately 20–40 % of patients. However, little data support withholding treatment from

individuals with psychiatric and substance use disorders. In fact, the emergence of depressive symptoms during treatment is actually associated with increased sustained viral response. Expanding access to treatment for such patients is recommended.

## ***Endocrine***

### **Diabetes Mellitus**

Depression and diabetes are two of the most common chronic diseases in the USA, and frequently co-occur. Nearly 30 % of patients with diabetes endorse depressive symptoms when screened, and 12–18 % meet diagnostic criteria for MDD [21, 22], which is 2–3 times higher than that of the general population. Overall lifetime prevalence of MDD among people with types 1 and 2 diabetes is about 29 %, more than double that of the general population [21]. The relationships between depression and diabetes are bidirectional; people with major depressive disorder have a higher risk of developing type 2 diabetes than those without depression. At the same time, patients with diabetes develop higher rates of depression than do age-matched non-diabetic counterparts. Moreover, patients with comorbid depression and diabetes have poorer glycemic control, more disability, and prospectively higher rates of microvascular and macrovascular morbidity, dementia, and mortality.

Anxiety disorders are also common among people with diabetes. A 2002 meta-analysis revealed that 14 % of people with diabetes across 18 different studies met diagnostic criteria for generalized anxiety disorder, while 40 % described anxiety symptoms [93]. Anxiety symptoms are associated with poor glycemic control and common sequelae of poorly controlled diabetes.

Diabetes is also common among patients with severe persistent mental illness. For example, in people with schizophrenia, the prevalence of diabetes is twice as high as in the general population (10 % vs. 6 %) [94]; it remains untreated in 30 % [95]. In the CATIE trial, 41 % of participants were found to have the metabolic syndrome, which is 2–3 times the prevalence of metabolic syndrome in the general population [96].

### **Thyroid Dysfunction**

Both clinical and subclinical hypothyroidism has been associated with mood disorders, including major depressive disorder and bipolar disorder. Hypothyroidism is considered a reversible cause of depression. The American Association of Clinical Endocrinologists recommends that the diagnosis of hypothyroidism should be considered in every patient with depression, with a careful history and exam for signs associated with thyroid dysfunction. In an Italian cohort of individuals with sub-clinical hypothyroidism, prevalence of depressive symptoms was 64 % [97].



Even though more traditionally associated with hypothyroidism, depression has also been described in 31–69 % of patients with hyperthyroidism [98]. Among patients with hyperthyroidism, 60 % meet diagnostic criteria for an anxiety disorder. Psychiatric symptoms do not consistently improve with hormone therapy, so often concomitant mental health treatment is required.

## ***Obstetric-Gynecology and Women's Health***

The prevalence of depressive disorders in obstetrics and gynecology practices has been reported to be as high as 27 % [99]. Postpartum depression prevalence is 10–15 % and usually appears in the first 2–3 months following delivery. Postpartum psychosis is estimated to occur at a rate of 0.1–0.2 %, and risk to the mother and child is high [100]. Transient postpartum blues lasting no more than 3–7 days is common and may occur in as many as 75 % of women postpartum and does not require treatment.

Between 14 and 23 % of pregnant women will experience a depressive disorder during pregnancy, while approximately 13 % of women took an antidepressant at some point in pregnancy in one study [101]. Depression during pregnancy has been associated with previous episodes of major depressive illness, poor self-rated health, and greater alcohol use and use of cigarettes while pregnant. Demographic factors such as not living with a partner, not working, and less education were also significantly related to elevated symptoms of depression during pregnancy.

A study of the prevalence of psychiatric disorders among women seen in a public-sector gynecologic clinic found that nearly 7 % had panic disorder and 6 % had generalized anxiety disorder, which is at least two times higher than rates found in the National Comorbidity Survey for women aged between 25 and 45 years [99]. Moreover, research has shown that pregnant women report more anxiety symptoms than non-pregnant women and such symptoms are associated with negative health outcomes for both mother and child.

PTSD is the third most common psychiatric disorder among economically disadvantaged pregnant women, with a prevalence rate of 7.7 % [101]. Women with PTSD are more likely to engage in high-risk behaviors such as smoking, poor nutrition, and interpersonal violence all of which have known negative consequences for both mothers and their newborns. Thirty-three percent of the women with PTSD report thoughts of self-harm and more than 27 % had comorbid substance use even during pregnancy. Moreover, women with PTSD have been shown to have more complications of pregnancy, including more ectopic pregnancies, miscarriages, hyperemesis, and preterm contractions than their counterparts without PTSD.

Eating disorders primarily affect women in their childbearing years. Prevalence of bulimia nervosa (BN) or binge eating disorder (BED) in a sample of both primary care and obstetric gynecology clinics was 6.2 % [102]. Furthermore, anxiety disorders, mood disorders, and diabetes were much more common among women with

BN or BED than among women without these eating disorders. Unfortunately, fewer than 10 % of cases with BN or BED were recognized by the patients' physicians.

When carefully assessed using DSM-V diagnostic criteria, premenstrual dysphoric disorder (PMDD) occurs in 2–5 % of community-based samples, prevalence rates are approximately twice as high in outpatient obstetric-gynecology clinics [103]. The premenstrual phase may also lead to exacerbation of existing Axis I diagnoses and comorbidity between PMDD and other mood disorders, including seasonal affective disorder has been noted.

Menopausal transition rather than the postmenopausal period appears to confer a higher risk for depression in women. Rates of depression range from 8 to 20 % in the menopausal phase [101]. Risk factors for depression in the perimenopausal period include a prior history of premenstrual or postpartum depression, life stress, poor health, and absence of a partner.

## Conclusion

BH problems are extremely common in medical settings and among a variety of medical illness across organ systems. Overall, 29 % of all persons with medical conditions have a comorbid mental health condition [6]. The majority of patients with BH disorders are seen only in the general medical health sector, and approximately two-thirds receive no treatment for these disorders [104]. Moreover, patients with high health service utilization tend to have high psychiatric comorbidity. However despite high utilization, such patients often receive little or no BH treatment. Finally, BH and medical conditions are risk factors for each other and the presence of one can complicate the course and treatment of the other. Based on these observations, it is essential that we integrate BH and medical care delivery to expand access, improve care, and reduce cost.

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