CHAPTER

21

Risk Factors and Prevention Strategies for Late-Life Mood and Anxiety Disorders

Lisa C. Barry[1] *and Amy L. Byers*[2]

[1]University of Connecticut Health Center, Center on Aging, Farmington, CT, USA [2]University of California, San Francisco, CA, USA and San Francisco Veterans Affairs Medical Center, San Francisco, CA, USA

OUTLINE

K.W. Schaie & S.L. Willis (Eds)
Handbook of the Psychology of Aging, Eighth edition.

DOI: http://dx.doi.org/10.1016/B978-0-12-411469-2.00021-2

INTRODUCTION

Mood disorders, as specified in the Diagnostic and Statistical Manual of Mental Disorders—Fourth (DSM-IV) or Fifth Edition (DSM-V), include major depressive disorder, dysthymia (i.e., persistent depression), and bipolar I and II disorder. These disorders are rare in older persons, with 3.6% of persons age 65–74 years, and approximately 2% of old-old (75–84 years) and oldest-old (≥85 years) persons, experiencing any mood disorders (DSM-IV) within a 12-month period (Byers et al., 2010). Of the mood disorders, the prevalence of either bipolar I or II among older persons is particularly low, with prevalence estimates of 0.5–1.0% (Byers et al., 2010; Kessler, Berglund et al., 2005; Unutzer, Simon, Pabiniak, Bond, & Katon, 1998). In contrast, subsyndromal depression, the presence of depressive symptoms that do not meet DSM criteria for major depression, is more common with prevalence estimates among community-living persons age 65 and older ranging from 8% to 30% (Blazer, 2003; Forlani et al., 2014). Anxiety disorders including panic disorder, agoraphobia without panic, specific phobia, social phobia, generalized anxiety disorder (GAD), and posttraumatic stress disorder (PTSD), are also frequently experienced by older persons, with a 12-month prevalence estimate of 8.9% among those age 65–74 years, 6.0% in those 75–84 years, and 8.1% in the oldest old (Byers et al., 2010). As will be further discussed, late-life mood and anxiety disorders have similar risk factors, overlapping symptom profiles, and frequently co-occur. These disorders are also often difficult to disentangle from other conditions that affect the elderly, making diagnosis and treatment challenging. However, given that persons with mental illness are living longer and that the incidence of late-onset mood and anxiety disorders is expected to increase with the rapid aging of the population, the prevalence of older persons with these disorders is expected to increase.

LATE-LIFE DEPRESSION

Epidemiology of Late-Life Depression

The first portion of this chapter will largely focus on late-life depression. Major depression is a common feature of late-life bipolar disorder. Furthermore, findings from brain magnetic resonance imaging (MRI) studies consistently indicate that white matter hyperintensity (WMH) burden, a marker of white matter disease, is high in older persons with major depressive disorder or bipolar disorder indicating similar psychopathology. Similarly, risk factors, treatment, and prevention for major depression, dysthymia, and subsyndromal depression are non-distinguishable.

Large-scale epidemiologic studies indicate that the prevalence of major depressive disorder among community-living samples of adults age 65 and older is approximately 1–5%, with the majority of studies reporting prevalence between 1% and 2% (Blazer, 2003; Hasin, Goodwin, Stinson, & Grant, 2005). Of those older adults with major depression, some evidence indicates that approximately half are experiencing their first onset of depression in late life (i.e., late-onset depression) (Brodaty et al., 2001; Bruce et al., 2002). However, because most studies of depression in later life do not distinguish early versus late onset, it is difficult to provide accurate estimates. General consensus indicates that those with early-onset depression are more likely to have a genetic predisposition to depression or a personality disorder (Brodaty et al., 2001). Yet, as will be discussed, identification of genes that may be particularly important in the development of late-life depression has focused on those associated with vascular disease. In contrast, the percentage of older persons with clinically significant depressive symptoms is high. Clinically significant depressive symptoms are depressive symptoms that do not meet the criteria for major depression yet are considered clinically important given their

association with functional impairment (Blazer, 2003; Hybels, Blazer, & Pieper, 2001; Lyness, King, Cox, Yoediono, & Caine, 1999; Lyness et al., 2007). Often referred to as depressed mood, subsyndromal depression, or simply "depression," clinically significant depressive symptoms affect between 8% and 30% of older persons living in the community (Blazer, 2003; Forlani et al., 2014), with 25–49% experiencing persistent symptoms (Barry, Abou, Simen, & Gill, 2012; Mackenzie, El-Gabalawy, Chou, & Sareen, 2014; Sneed, Rindskopf, Steffens, Krishnan, & Roose, 2008). Among older persons, white males age 85 years and older have been reported as having the highest prevalence of clinically significant depressive symptoms (18.9%) (U.S. Census Bureau, 65+ in the United States; U.S. Government Printing Office, Washington, DC, 2014).

Depression in older adults is a significant public health concern because it is associated with adverse outcomes across its broad spectrum. Older adults with depression, from major depression to subsyndromal depression, are more likely to experience increased health care costs (Katon, Lin, Russo, & Unutzer, 2003), exacerbation of co-existing medical illness (Carnethon et al., 2007), onset of disability in activities of daily living (ADLs; Barry, Allore, Bruce, & Gill, 2009; Barry, Murphy, & Gill, 2011; Penninx, Leveille, Ferrucci, Van Eijk, & Guralnik, 1999), and mortality (Penninx, Geerlings, et al., 1999; Unutzer, Patrick, Marmon, Simon, & Katon, 2002). Furthermore, both risk and protective factors are similar for major depressive disorder and clinically significant depressive symptoms.

Sociodemographic Risk Factors for Depression

Sex

It is well-established that the burden of depression is disproportionately higher among older women than men (Barry, Allore, Guo, Bruce, & Gill, 2008; Beekman, Copeland, & Prince, 1999; Sonnenberg, Beekman, Deeg, & van Tilburg, 2000), with this marked gender difference remaining throughout old age and only narrowing among the oldest old (Djernes, 2006). The prevalence of depression is not only higher among older women, but women are also more likely to have more severe depressive symptoms (Shanmugasegaram, Russell, Kovacs, Stewart, & Grace, 2012). Reasons for the preponderance of depression in older women do not appear to be an artifact of greater symptom reporting among women. Rather, this sex difference has been attributed to women's greater likelihood of having been exposed to risk factors for depression including lower income and having one or more chronic illnesses (Sonnenberg et al., 2000), and women's higher likelihood of experiencing depression onset and persistence of depressive symptoms (Barry et al., 2008). One study also reported that, once depressed, women have a lower likelihood of dying as compared with men (Barry et al., 2008). Whereas older men generally have higher mortality rates than older women, irrespective of depression, the findings from this aforementioned study showed a nearly threefold difference in the odds ratios for participants who were depressed compared with those who were not depressed. Women who were depressed were 75% less likely to die as compared with men who were depressed. In contrast, among the non-depressed, women were 20% less likely to die than men.

Race

Persons age ≥65 years in the United States are predominantly white but are becoming increasingly diverse. Whereas minority populations comprised approximately 20% of older adults in 2010, projections indicate that by 2050 the composition of the older population will be 58% non-Hispanic White, 20% Hispanic, 12% Black, and 9% Asian ("Older Americans 2012: Key Indicators of Well-Being," 2012).

Despite growing numbers of minorities living to older ages, whether or not race is a risk factor for mood disorders in later life is uncertain. The majority of studies focusing on race differences in mood disorders in later life have evaluated Black–White differences in depression. However, how depression is defined across studies contributes to the uncertainty regarding the role of Black–White race in late-life depression. Whereas the 12-month prevalence of major depression has been reported to be similar among older Whites and Blacks (Byers et al., 2010), some studies report that Blacks are more likely to experience clinically significant depressive symptoms, even after controlling for factors such as socioeconomic status (SES) (Barry et al., 2014; Jang, Borenstein, Chiriboga, & Mortimer, 2005). In the United States, SES and race are inextricably related, with Blacks having markedly fewer socioeconomic resources than Whites (LaVeist, 2005). Consequently, controlling for SES is particularly important in studies evaluating race differences in health outcomes. Other studies report the opposite or have found no association (Cohen, Magai, Yaffee, & Walcott-Brown, 2005; Gallo, Cooper-Patrick, & Lesikar, 1998). Longitudinal studies evaluating race differences in trajectories of depression symptoms indicate that as compared with older Whites, older Blacks are more likely to experience an increase in depressive symptoms (Skarupski et al., 2005) and an increase in depression onset (Barry et al., 2014) over time. However, findings from the Health and Retirement Study (HRS) and its companion study, the Asset and Health Dynamics among the Oldest Old (AHEAD), indicate that the rate of change in depressive symptoms over time is lower for older Blacks and Hispanics as compared with older Whites (Xiao, Liang, Bennett, Quinones, & Wen, 2010). Because older Blacks, more so than Whites, live in areas with lower-quality healthcare, neighborhood characteristics may contribute to older Blacks' (Beard et al., 2009) higher likelihood of experiencing depression onset or an increase in depressive symptoms. Among those with depressive symptoms, the lower rate of increase over time for minorities as compared with Whites, particularly among Hispanics, may be explained by minority persons' effective use of coping strategies in old age that they learned throughout life to deal with racial discrimination (Ferraro & Farmer, 1996).

Biological and Clinical Risk Factors for Depression

The Inter-relationship Between Cardiovascular Disease, Dementia, and Depression

Older adults with depression have an increased risk of developing cardiovascular disease and dementia. In fact, evidence that vascular disease is the underlying link between depression and dementia is strong (Byers & Yaffe, 2011). This link is largely grounded in the "vascular depression hypothesis" (Alexopoulos et al., 1997; Krishnan, Hays, & Blazer, 1997), which states that cerebrovascular disease predisposes to, precipitates or perpetuates some geriatric depressive syndromes (Alexopoulos, 2003, 2005). Although it has been suggested that vascular lesions and structural changes in the brain lead to depression in late life (Camus, Kraehenbuhl, Preisig, Bula, & Waeber, 2004; De Groot et al., 2000; Thomas, Perry, Barber, Kalaria, & O'Brien, 2002), the direction of such an association is debatable, as vascular disease or vascular lesions and depression are related to an increased risk of developing the other (Thomas, Kalaria, & O'Brien, 2004).

The pathway that explains the inter-relationship between vascular disease, depression, and dementia is probably not sequential. Prior depression is related to subsequent vascular disease through multiple proposed mechanisms, including behavioral conditions (e.g., smoking, inactivity),hypothalamic–pituitary–adrenal(HPA)

axis dysregulation and elevated cortisol related to the metabolic syndrome, disruption of normal endothelial function and development of hypertension, and pro-inflammatory cytokines (Butters et al., 2008). As evidence, depression has been found to increase risk of first-ever myocardial infarction and stroke (Liebetrau, Steen, & Skoog, 2008). On the other hand, evidence that vascular disease promotes development of depression is well established. For example, risk of depression is substantially increased post-MI and post-stroke (Thomas et al., 2004). In addition, MRI studies have supported robust associations between ischemic brain lesions and depression or depressive symptoms in older adults (Herrmann, Le Masurier, & Ebmeier, 2008; Steffens, Krishnan, Crump, & Burke, 2002). Longitudinal studies provide evidence that large cortical lesions and severe subcortical white matter grade are significant risk factors for developing depressive symptoms (Steffens et al., 2002); with these changes predating and predicting late-life depression (Steffens et al., 2002; Teodorczuk et al., 2007).

The "vascular–depression–dementia hypothesis," is further supported by evidence that vascular disease contributes to the clinical manifestation of dementia symptoms (Flicker, 2008, 2010). Ischemic damage, largely in the frontostriatal brain regions, may lead to significant cognitive deficits (Alexopoulos, 2006). Finally, the ischemic damage to frontostriatal brain regions may explain the executive function deficits and psychomotor slowing that are common in late-life depression (Bruce et al., 2002; Butters et al., 2008; Sheline et al., 2008). This suggests that ischemic structural changes in the brain are a common etiologic factor of both the depression and the related cognitive impairment.

Other likely biological mechanisms linking depression to dementia include alterations in glucocorticoid steroid levels and hippocampal atrophy, inflammatory changes, deficits of nerve growth factors, and increased deposition of amyloid-β plaques (Byers & Yaffe, 2011). In particular, amyloid-associated depression, defined as the presence of clinical symptoms of depression and a high plasma $A\beta_{40}$:$A\beta_{42}$ ratio, may define a subtype of depression representing a prodromal manifestation of Alzheimer disease given its strong association with memory impairment (Sun et al., 2008). Recent findings from the Health Aging and Body Composition (Health ABC) Study have also found that older persons with a high $A\beta_{40}$:$A\beta_{42}$ ratio who also have an APOE e4 allele may be at increased risk for incident depression (Metti et al., 2013).

In summary, although research supports an association between late-life depression and risk of dementia, inconsistencies across individual studies exist. Because of the timing of many of these studies in late life, they cannot distinguish whether depression or depressive symptoms are a prodromal phase of dementia or consequence of the onset of AD or are a risk factor. In fact, the variability of the duration of follow-up (e.g., 0–17 years) and unknown frequency or duration of depressive episodes may explain the heterogeneity of findings. In contrast, earlier-life depression (typically defined as depression or depressive symptoms occurring before age 60) consistently has been found to be a risk factor for (and unlikely prodrome of) dementia (Jang et al., 2005). However, more longitudinal studies over the lifespan are necessary in order to fully understand the relationship between depression and depressive symptoms and risk of developing dementia in late life.

Disability

A large body of literature has evaluated the association between disability in ADLs (e.g., bathing, walking, dressing, transferring) and depression in older persons, with general consensus that these conditions are inextricably linked. However, some research points to a

stronger influence of disability on subsequent depression than that of depression on disability (Chen et al., 2012; Ormel, Rijsdijk, Sullivan, van Sonderen, & Kempen, 2002). Stress theory (Avison & Turner, 1988; Pearlin, Lieberman, Menaghan, & Mullan, 1981) asserts that new disability or the ongoing psychological and physical stress of chronic disability alters homeostasis, thereby leading to depression. In turn, depression may alter neural, hormonal, or immunological function, subsequently resulting in disability. Whereas many cross-sectional studies and studies with one follow-up period have found a relationship between disability and depression in older persons (Bruce, 2001; Harris, Cook, Victor, DeWilde, & Beighton, 2006; Ormel et al., 2002), findings from large prospective cohort studies have contributed significantly to our understanding of this relationship. The Precipitating Events Project (PEP) (Gill, Desai, Gahbauer, Holford, & Williams, 2001), an ongoing prospective cohort study of 754 nondisabled members of a large health plan who were 70 years of age or older at study initiation in 1998, includes monthly self-reported assessments of ADL disability and assessments of depressive symptoms every 18 months. Findings from PEP have shown that not only is disability a salient risk factor for depression, but also that the burden of disability influences this relationship. Barry, Soulos, Murphy, Kasl, and Gill (2013) found that PEP participants' odds of experiencing clinically significant depressive symptoms, as assessed using the 11-item Centers for Epidemiologic Studies-Depression Scale (Kohout, Berkman, Evans, & Cornoni-Huntley, 1993), increased as the severity of their disability increased, with particularly high odds of depression among those with both chronic and severe disability as compared with those with no disability (OR = 2.42; 95%CI 1.78–3.30). These researchers also found that depression in older persons is not only associated with disability onset, but it is also associated with worsening severity of disability and a lower likelihood of recovering from disability (Barry et al., 2011).

Psychosocial Risk Factors for Depression

Social Support

What is now a vast literature detailing the influence of social support on health was spurned by Cassel (1976) and Cobb (1976), epidemiologists who suggested that investigation of this relationship was critical. Whereas earlier studies had described a link between socialization and depression (Paykel, Weissman, Prusoff, & Tonks, 1971; Paykel & Weissman, 1973), it was nearly two decades after the publication of the Cassel and Cobb studies that research began to accumulate regarding the impact of social support on the mental health of older persons. Early findings from the New Haven Established Populations for Epidemiologic Study of the Elderly (EPESE) indicated that the perceptions that one has adequate emotional support and available instrumental support each were independently associated with fewer depressive symptoms in older persons (Oxman, Berkman, Kasl, Freeman, & Barrett, 1992), with emotional support characterized by the amount of "love and caring, sympathy and understanding, and/or esteem or value available from others" (Thoits, 1995) and instrumental support referring to "help, aid, or assistance with tangible needs such as getting groceries, getting to appointments, phoning, cooking, cleaning, or paying bills" (Berkman & Kawachi, 2000). To date, a large number of studies have evaluated the association between social support and depression in older persons and have expanded the research to numerous related concepts including social network, social integration/connectedness, and social participation (Schwarzbach, Luppa, Forstmeier, Konig, & Riedel-Heller, 2014). Generally, qualitative aspects of social support (e.g., perceived emotional support; quality of relationships) seem to have a greater

impact on depression in late life than quantitative aspects (e.g., number of members in one's social network). Furthermore, not all social support has a positive effect on depression. The perception of social support as excessive or unhelpful, often in regard to instrumental support, has been found to be associated with increased depressive symptoms in older persons (Nagumey, Reich, & Newsom, 2004). Increased resentment as one's independence is compromised may increase the likelihood of experiencing depression, despite the intentions of the one providing the support.

Bereavement

Whereas bereavement is a normal response to death accompanied by acute grief symptoms that typically attenuate over time, it is a severe stressor that can precipitate a mental health disorder. Prior studies have found an association between bereavement and major depressive disorder, with a meta-analysis of prospective studies indicating that the risk of experiencing depression in those age 50 and older was more than threefold among the bereaved (Cole & Dendukuri, 2003). However, while this risk is high, bereavement still confers a lower risk of depression in older persons as compared with younger and middle-aged adults. In terms of spousal death, which is common in older age, the risk difference between younger and older persons is largely attributed to the greater expectedness of a spouse's death in late life as compared with early or midlife (Blazer & Hybels, 2005). Earlier studies indicate that spousal bereavement has more negative psychological effects on men. Following the death of a spouse, men are more likely to become depressed and to be depressed longer. This gender difference has been attributed to older men's unfamiliar household management roles (Umberson, Wortman, & Kessler, 1992). As traditional societal gender roles continue to diminish, it will be interesting to determine whether gender will continue to influence the association between bereavement and depression among emerging cohorts of older persons.

Whether or not bereavement leads to negative mental health outcomes in older persons may also depend, in part, on the availability of social support and the context in which it occurs. Frequency of social contact has been found to be associated with better psychological health among widowed older persons (Beckman, 1981; Silverstein & Bengtson, 1994). However, more recent data from 209 widowed persons who were participants in the Changing Lives of Older Couples (CLOC) study indicate that the amount of social contact is not associated with depressive symptoms once degree of emotional support and the agreement between the widowed person's preferred and actual levels of social contact have been taken into consideration (Ha & Ingersoll-Dayton, 2011). These latter findings indicate that the emotional meaningfulness of social relationships may matter more to older persons' psychological health than the amount of actual contact. Relatedly, negative social relationships may also be associated with psychological health among older widowed persons. For example, results from one study that focused on changes in positive and negative support from the children of widowed older persons indicated that negative support was associated with increased anxiety and a decrease in positive support was associated with increased depressive symptoms (Ha, 2010).

While bereavement may be associated with depression, whether other more severe and chronic forms of grief can be distinguished clinically from bereavement-related depression has been debated for more than two decades (Prigerson et al., 1995). In fact, there was significant debate regarding whether or not complicated grief and/or prolonged grief disorder (PGD) should be included in DSM-V (Lichtenthal, Cruess, & Prigerson, 2004; Prigerson et al., 2009; Shear et al., 2011). Given that no consensus was reached regarding their

inclusion, the "bereavement exclusion" was removed from the clinical criteria of depression and adjustment disorders (Wakefield & First, 2012). However, removal of that exclusion is also controversial mainly due to a worry that grief will become "medicalized" and grieving individuals may be inappropriately prescribed antidepressant medications. Consequently, "persistent complex bereavement disorder" is included in the DSM-V in a chapter on conditions needing further study.

LATE-LIFE ANXIETY DISORDERS

Epidemiology of Late-Life Anxiety Disorders

Although most information on late-life mental health disorders has focused on mood disorders, particularly major depressive disorder, the occurrence of anxiety disorders has been found to be as high or even higher. Nationally representative 12-month prevalence estimates from the National Comorbidity Survey Replication (NCS-R) determined that nearly 12% of older adults aged 55 years and older had any anxiety disorder compared with 5% having any mood disorder (Byers et al., 2010). In younger adults (18–44 years), the 12-month prevalence of any anxiety disorder was markedly higher (20.7%) than for older adults (Gum, King-Kallimanis, & Kohn, 2009). When stratified by young-old (55–64 years), mid-old (65–74 years), old-old (75–84 years), and oldest-old (≥85 years) US respondents, the prevalence was 16.6%, 8.9%, 6.0%, and 8.1%, respectively, for any anxiety disorder (Byers et al., 2010). In comparison, for any mood disorder, it was 7.6%, 3.6%, 1.8%, and 2.4%, respectively.

Among the NCS-R adults aged 55 years and older, the most prevalent anxiety disorder was specific phobia (6.5%), followed by social phobia (3.5%), PTSD (2.1%), GAD (2.0%), panic disorder (1.3%), and agoraphobia (0.8%). Similarly, anxiety disorders were the most prevalent disorders among those aged 65 years and older in the Epidemiologic Catchment Area Survey (5.5%) with phobic disorder the most prevalent individual disorder (4.8%) (Hybels & Blazer, 2003). In contrast, the Longitudinal Aging Study Amsterdam determined high rates of GAD (7.3% vs. 2.0% in the NCS-R) (Beekman et al., 1998). This discrepancy between reported prevalence rates highlights largely methodological differences (e.g., sampling procedures and attrition rates, definition and operationalization of anxiety) and potential cultural differences between population-based studies.

Risk Factors for Late-Life Anxiety Disorders

Despite the high prevalence of anxiety disorders in late life, risk factors associated with late-life anxiety have not been well studied or conceptualized. The limited research suggests that risk factors for anxiety are similar to those for depression. This is not surprising given the strong overlap between anxiety and depression seen throughout adult life and in late life (as described below). First, shared genetic risk has been found between GAD and depression (Kendler, Gardner, Gatz, & Pedersen, 2007). Secondly, research from the NCS-R has shown that anxiety disorders throughout the lifespan are associated with female gender, higher number of comorbid chronic medical conditions, being unmarried or divorced, and having less than a high school education (Gum et al., 2009). Furthermore, research suggests that cognitive impairment and dementia may be major risk factors for anxiety in late life (Seignourel, Kunik, Snow, Wilson, & Stanley, 2008); however, the overlap of symptomatology between anxiety and dementia complicates assessing the association. In addition, older adults with vascular dementia have been found to have higher prevalence of anxiety than older adults with Alzheimer's-type dementia (Seignourel et al.,

2008), which suggests that anxiety in dementia may be related to the vascular risk for depression in late life.

LATE-LIFE CO-EXISTING MOOD AND ANXIETY DISORDERS

Epidemiology of Late-Life Co-existing Mood–Anxiety Disorders

Most US studies of co-existing mood and anxiety disorders have been clinically based and found high prevalence of comorbid anxiety in patients with depression (Lenze, 2003; Lenze et al., 2000, 2001). Twenty-three percent of older subjects (aged 60 years and older) with depressive disorders had a current anxiety disorder diagnosis (Lenze et al., 2000). The most common current co-existing anxiety disorders were panic disorder (9.3%), specific phobia (8.8%), and social phobia (6.6%). Interestingly, 27.5% of older subjects with depression had symptoms that met criteria for GAD. The prevalence went up to 45% GAD symptoms for those in the inpatient psychiatric subgroup. In contrast, nationally representative estimates from population-based research in NCS-R respondents documented that the 12-month prevalence of any co-existing mood and anxiety disorder was 3% among adults aged 55 years and older (Byers et al., 2010).

Characteristics of Co-existing Mood–Anxiety Disorders

Co-existing mood and anxiety disorders in late life appear to be largely delineated by the severity of somatic symptoms related to the mood or anxiety disorder, a decline in function, or a particularly high accumulation of individual risk factors for mood or anxiety. Consequently, there is growing support for the view that because many depressed individuals meet criteria for GAD, often only during the depressive episodes, the presence of GAD in a major depressive episode should be considered a severity marker rather than as a separate diagnosis. Supporting this line of reasoning, one study found that in older adults with depressive disorders, greater severity of depressive symptoms was associated with greater likelihood of GAD symptoms including poorer social function and high levels of somatic symptoms (such as sweating, nausea, and palpitations). However, this study also found that symptoms of GAD were independently associated with greater suicidality, even after controlling for severity of depressive symptoms (Lenze et al., 2000).

RISK FACTORS FOR LATE-LIFE SUICIDE AND SUICIDAL BEHAVIOR

Older adults who are living in the community have suicide rates comparable to or higher than any other age group (Conwell, Duberstein, & Caine, 2002), accounting for approximately 15% of deaths by suicide in the United States ("Medicare Improvements for Patients and Providers Act"). Older white men are at particularly high risk. Whereas older adults are less likely than younger adults to engage in suicidal behavior which includes suicidal ideation (i.e., thoughts, plans, or wishes to die or kill oneself) or overt actions such as a suicide attempt, older adults have a much higher likelihood of dying when they make a suicide attempt. For every completed suicide among older adults, an estimated 2–4 attempts occur (McIntosh, Santos, Hubbard, & Overholser, 1994), while in younger adults the ratio of completed suicide to attempts may be as high as 200–1 (Fremouw, dePerczel, & Ellis, 1990). This difference has been attributed to older adults' higher likelihood of using methods that are likely to result in a fatality, such as firearms; 67% of suicides among older adults occur via firearms.

Depression and prior suicide attempts are well-established risk factors for suicide that are shared by all age groups (National Institute of Mental Health, 2015). As compared with younger persons, however, suicide rates in older persons are more closely associated with major depression. Depression is the most common psychiatric diagnosis in older persons who died by suicide (Conwell, Van Orden, & Caine, 2011), and both population-based studies and psychological autopsy studies among persons who have died by suicide have found that the association between suicidal ideation and depression is significantly stronger in older persons than in younger persons (Dennis et al., 2007; Gaynes et al., 2004).

Older persons also have a distinct risk profile for suicide. Research has shown that 45% of older adults who die by suicide have seen a primary care provider within a month before their suicide (Luoma, Martin, & Pearson, 2002). Comorbid chronic medical illness, particularly that which results in inpatient hospitalization or need for home care, pain, loss of independence resulting from disability in ADLs such as bathing and dressing, loss of control over choices regarding one's health, and reduced sense of purpose are risk factors for suicide in older persons (Conwell et al., 2002, 2010; Juurlink, Herrmann, Szalai, Kopp, & Redelmeier, 2004). In addition, lack of social connectedness (e.g., social isolation, low social support) is an important risk factor for suicide among older adults which, in turn, may also make them less likely to be rescued after an attempt (Conner, Conwell, & Duberstein, 2001). Emerging research areas regarding risk factors for suicide in older persons include impulsivity in the context of cognitive impairment (Dombrovski et al., 2008; Erlangsen, Zarit, & Conwell, 2008) and change in living situation, such as a move to a long-term care facility (Mezuk, Rock, Lohman, & Choi, 2014).

Suicidal behavior, like suicide, is highly associated with depression and depressive symptoms, which are considered the major risk factors for such behavior. Whereas individual anxiety disorders have not been well established as risk factors for suicide in older persons, there is some evidence indicating that anxiety disorders are associated with suicidal behavior in this population. Lenze et al. (2000) found that symptoms of GAD were associated with greater likelihood of suicidal ideation above and beyond depressive severity and other comorbid anxiety disorders in older adults with depressive disorders. In a population-based study of older primary care patients from Australia, respondents with anxiety, defined by using clinically significant cutoff scores based on the Hospital Anxiety and Depression Scale, were nine times more likely to have suicidal ideation than those without anxiety (95% confidence interval (CI): 7.3–10.5). The association was 11-fold increased odds for those with depression (95%CI: 8.7–14.3), and went up to 29-fold increased odds of suicidal ideation for those with comorbid anxiety–depression (95%CI: 23.9–36.0) (Almeida et al., 2012). Relatedly, although PTSD has been established as a risk factor for completed suicide in younger veterans (Pompili et al., 2013; Sher, Braquehaid, & Casas, 2012), little is known about the association between PTSD and suicide risk in older adults. Studies of younger veterans have shown that PTSD is highly associated with suicide and suicidal behavior (Brenner et al., 2011; Pompili et al., 2013). In addition, PTSD, agoraphobia, GAD, panic disorder, social anxiety disorder, and specific phobia have been documented in nationally representative studies of younger adults as risk factors for suicidal behavior (Thibodeau, Welch, Sareen, & Asmundson, 2013). However, research is controversial in this area, and almost nothing is known about the impact of individual anxiety disorders on suicide or suicidal behavior in late life (Sareen, 2011).

DETECTION, TREATMENT, AND MANAGEMENT

Despite the prevalence of late-life mood and anxiety disorders, and their associated negative outcomes, these conditions are amenable to treatment through both pharmacologic and psychological/behavioral methods (Alexopoulos et al., 2009; Bruce et al., 2004; Charney et al., 2003; Wolitzky-Taylor, Castriotta, Lenze, Stanley, & Craske, 2010). Antidepressant medications are the most common treatment for depression in older persons (Mottram, Wilson, & Strobl, 2006) and because many antidepressants are safe and well-tolerated in this population (Mamdani, Parikh, Austin, & Upshur, 2000; Sonnenberg, Deeg, Comijs, van Tilburg, & Beekman, 2008), they are considered a first-line treatment for a spectrum of late-life depressive disorders, including clinically significant depressive symptoms (Alexopoulos et al., 2001). Receiving therapy from a mental health professional, such as a psychiatrist, psychologist, or counselor, also has been found to be effective in treating depression in this population (Cuijpers, van Straten, & Smit, 2006; Pinquart, Duberstein, & Lyness, 2006). However, although there are effective treatments for mood disorders and anxiety, there is widespread under-treatment of these conditions in older persons across multiple settings (Barry et al., 2012; Cuijpers et al., 2006; Pinquart et al., 2006; Sonnenberg et al., 2008). This under-treatment has largely been attributable to under-diagnosis resulting from a combination of physician, patient, and system-level factors (Mitchell, Rao, & Vaze, 2010; Park & Unutzer, 2011). Physicians may misdiagnose mood disorders as dementia, may mistakenly attribute symptoms of mood or anxiety disorders as an acceptable response to illness or loss of social support in late life, or may have limited time to address mental health during a routine office visit (Tai-Seale, McGuire, Colenda, Rosen, & Cook, 2007). Older patients also may be reluctant to report psychological symptoms (Lebowitz et al., 1997; Lyness et al., 1995).

Even if late-life mood and/or anxiety disorders are recognized, estimates indicate that over 50% of older adults symptomatic for a clinical diagnosis do not use mental health services (Klap, Unroe, & Unutzer, 2003; Klap et al., 2003). Data from the NCS-R show that there is a high prevalence of non-use of mental health services for older Americans (aged 55 years and older) meeting criteria for DSM-IV mood and anxiety disorders (Byers, Arean, & Yaffe, 2012), with the highest prevalence of non-use for specific phobia (79.5%), social phobia (69.7%), and GAD (65.6%). In contrast, rates of non-use were slightly lower for younger NCS-R adults (aged 54 years and younger), with non-use approximately 60% for moderate to serious psychiatric disorders (Kessler, Demler et al., 2005). However, among older NCS-R respondents with comorbid mood–anxiety disorders rates of non-use decreased to 50%, suggesting that severity of disorder increases use of mental health services (Byers, Arean, & Yaffe, 2012). Moreover, when considering the old-old and oldest-old age groups (as documented from the National Epidemiologic Survey of Alcohol and Related Conditions (NESARC)), non-use of mental health services is extremely high with approximately 90% of those with an anxiety disorder not using services and over 70% of those with a mood disorder not using services (Mackenzie, Reynolds, Cairney, Streiner, & Sareen, 2012). Research suggests that low perceived need, moderate resources, and low motivation for mental health care help to explain why services may not be sought by older adults, despite diagnosable mood and anxiety disorders (Byers et al., 2012). Furthermore, it is only recently that parity in Medicare copayments for both physical and mental health conditions was established via the Medicare Improvements for Patients and Providers Act [H.R. 6331; 110th Congress; July 15, 2008]. Prior to this legislation,

Medicare recipients were required to pay 50% for mental health services, and 20% copays for both physical and mental health services did not take effect until 2014. Research will be needed to determine the impact of this legislation on mental health services use in older persons.

The majority of older persons who are diagnosed with a mood and/or anxiety disorder are subsequently treated and managed by primary care physicians who often lack training in geriatric specialty care (Crystal, Sambamoorthi, Walkup, & Akincigil, 2003; Harman, Veazie, & Lyness, 2006). More than a decade ago, collaborative care for depression was proposed as an approach for optimizing treatment and management of depression in primary care. The collaborative care model emphasizes care management and education via a depression care manager. The Improving Mood—Promoting Access to Collaborative Treatment (IMPACT) program for late-life depression, was the first multisite randomized control trial to compare collaborative depression care with usual care in a sample comprised entirely of older persons (Unutzer et al., 2001, 2002). Results from the IMPACT trial indicated that older persons receiving collaborative care for depression had higher treatment rates, higher satisfaction with depression care, and greater improvements in depression as compared with those receiving usual care. Albeit modest, findings from the IMPACT trial have also shown a positive impact of collaborative care for depression on physical activity and quality of life. Since publication of the IMPACT trial results, many other studies have confirmed the effectiveness of collaborative care programs in decreasing depressive symptoms in older persons (Chang-Quan et al., 2009), including special populations of older persons such as low-income elders, those with concomitant chronic illnesses (Katon et al., 2010), patients with recent cardiac events (Huffman et al., 2014), and those receiving home care. Furthermore, as evidenced through results from the Prevention of Suicide in Primary Care Elderly: Collaborative Trial (PROSPECT), a randomized controlled trial comparing treatment guidelines tailored for the elderly with care management and usual care, collaborative care may be useful for reducing suicidal ideation in depressed elders. "Stepped care" is another approach to managing depression in later life. This approach, which focuses on preventing the transition from subsyndromal depression to major depressive disorder, involves using methods such as watchful waiting, physical activity, and education before use of antidepressants. Treating older persons with subsyndromal depression as a means of preventing a full-blown disorder may have significant impact. Findings from the Amsterdam Study of the Elderly indicate that treating 5.8 older persons with subsyndromal depression may prevent one of these individuals from experiencing the onset of clinical depression within 3 years (Schoevers et al., 2006). These investigators estimate that treating all older persons with subsyndromal depression could prevent 24.6% of new depression onsets during a 3-year period (Schoevers et al., 2006).

Recent advances in neuroimaging have enabled investigators to evaluate structural and functional differences in the brains of individuals with and without late-life depression, thereby determining who may be more vulnerable to developing this disorder. The use of structural imaging methods in late-life depression, described in detail in two reviews (Benjamin & Steffens, 2011; Hoptman, Gunning-Dixon, Murphy, Lim, & Alexopoulos, 2006), has been especially useful in determining white matter lesion volume—a biomarker for classifying depression into vascular versus nonvascular depression (Sneed et al., 2008).

CONCLUSION

The majority of older persons maintain high levels of subjective well-being, even when faced with significant health problems and

compromised physical function. However, the number of older persons experiencing mood and/or anxiety disorders is expected to increase with the continued growth of the older adult population. Late-life mood and anxiety disorders are characterized by heterogeneity, varying widely in both severity and chronicity, and ranging from subsyndromal depression and clinically significant depressive and/or anxiety symptoms to a full-blown major depressive disorder or a co-morbid mood-anxiety disorder. Regardless of whether or not an older person's symptoms confer a clinical diagnosis, individuals who experience a late-life mood or anxiety disorder may be particularly vulnerable to both the onset and worsening of chronic illness and disability, and they are at higher risk for suicide and non-suicide-related mortality. Consequently, mood and anxiety disorders are a considerable public health problem for older persons.

There is general consensus that risk factors for late-life mood and anxiety disorders include genetic vulnerability, physical illness and disability, and psychosocial factors such as lack of social support. While these risk factors have been evaluated independently, research examining how these risk factors interact to affect the onset and/or worsening of late-life mood and anxiety disorders is sorely needed. This line of research will also help to improve our understanding of how some older persons are resilient in the face of challenges such as disability or grief, while others are more apt to experience late-life mood and anxiety disorders when confronted with the same challenges.

Effective treatments for late-life mood and anxiety disorders are available. However, there is still substantial under-treatment of these disorders in this population. With clinicians likely to see increasing numbers of older patients in the near future, improved understanding of risk factors is necessary to improve recognition of late-life mood and anxiety disorders and to help inform intervention and prevention efforts in older persons.

References

Alexopoulos, G. S. (2003). Vascular disease, depression, and dementia. *Journal of the American Geriatrics Society*, *51*(8), 1178–1180.

Alexopoulos, G. S. (2005). Depression in the elderly. *Lancet*, *365*(9475), 1961–1970.

Alexopoulos, G. S. (2006). The vascular depression hypothesis: 10 years later. *Biological Psychiatry*, *60*(12), 1304–1305.

Alexopoulos, G. S., Katz, I. R., Reynolds, C. F., Carpenter, D., Docherty, J. P., & Ross, R. W. (2001). Pharmacotherapy of depression in older patients: A summary of the expert consensus guidelines. *Journal of Psychiatric Practice*, *7*(6), 361–376.

Alexopoulos, G. S., Meyers, B. S., Young, R. C., Campbell, S., Silbersweig, D., & Charlson, M. (1997). Vascular depression" hypothesis. *Archives of General Psychiatry*, *54*(10), 915–922.

Alexopoulos, G. S., Reynolds, C. F., III, Bruce, M. L., Katz, I. R., Raue, P. J., Mulsant, B.H., et al. (2009). Reducing suicidal ideation and depression in older primary care patients: 24-month outcomes of the PROSPECT study. *The American Journal of Psychiatry*, *166*(8), 882–890.

Almeida, O. P., Draper, B., Snowdon, J., Lautenschlager, N. T., Pirkis, J., & Pfaff, J. J. (2012). Factors associated with suicidal thoughts in a large community study of older adults. *The British Journal of Psychiatry: The Journal of Mental Science*, *201*(6), 466–472.

Avison, W. R., & Turner, R. J. (1988). Stressful life events and depressive symptoms: Disaggregating the effects of acute stressors and chronic strains. *Journal of Health and Social Behavior*, *29*(3), 253–264.

Barry, L. C., Abou, J. J., Simen, A. A., & Gill, T. M. (2012). Under-treatment of depression in older persons. *Journal of Affective Disorders*, *136*(3), 789–796.

Barry, L. C., Allore, H. G., Bruce, M. L., & Gill, T. M. (2009). Longitudinal association between depressive symptoms and disability burden among older persons. *The Journals of Gerontology. Series A: Biological Sciences and Medical Sciences*, *64*(12), 1325–1332.

Barry, L. C., Allore, H. G., Guo, Z., Bruce, M. L., & Gill, T. M. (2008). Higher burden of depression among older women: The effect of onset, persistence, and mortality over time. *Archives of General Psychiatry*, *65*(2), 172–178.

Barry, L. C., Murphy, T. E., & Gill, T. M. (2011). Depressive symptoms and functional transitions over time in older persons. *The American Journal of Geriatric Psychiatry*, *19*(9), 783–791.

Barry, L. C., Soulos, P. R., Murphy, T. E., Kasl, S. V., & Gill, T. M. (2013). Association between indicators of disability burden and subsequent depression among older persons. *The Journals of Gerontology. Series A: Biological Sciences and Medical Sciences*, *68*(3), 286–292.

Barry, L. C., Thorpe, R. J., Jr., Penninx, B. W., Yaffe, K., Wakefield, D., & Simonsick, E. M. (2014). Race-related differences in depression onset and recovery in older persons over time: The health, aging, and body composition study. *The American Journal of Geriatric Psychiatry*, *22*(7), 682–691.

Beard, J. R., Cerda, M., Blaney, S., Ahern, J., Vlahov, D., & Galea, S. (2009). Neighborhood characteristics and change in depressive symptoms among older residents of New York City. *American Journal of Public Health*, *99*(7), 1308–1314.

Beckman, L. J. (1981). Effects of social interaction and children's relative inputs on older women's psychological well-being. *Journal of Personality and Social Psychology*, *41*(6), 1075–1086.

Beekman, A. T., Copeland, J. R., & Prince, M. J. (1999). Review of community prevalence of depression in later life. *British Journal of Psychiatry*, *174*, 307–311.

Beekman, A. T. F., Bremmer, M. A., Deeg, D. J. H., Van Balkom, A. J. L. M., Smit, J. H., & Van Tilburg, W. (1998). Anxiety disorders in later life: A report from the longitudinal aging study Amsterdam. *International Journal of Geriatric Psychiatry*, *13*(10), 717–726.

Benjamin, S., & Steffens, D. C. (2011). Structural neuroimaging of geriatric depression. *The Psychiatric Clinics of North America*, *34*(2), 423–435.

Berkman, L. F., & Kawachi, I. (2000). *Social epidemiology*. New York, NY: Oxford University Press, Inc.

Blazer, D. G. (2003). Depression in late life: Review and commentary. *Journals of Gerontology. Series A: Biological Sciences & Medical Sciences*, *58*(3), 249–265.

Blazer, D. G., II, & Hybels, C. F. (2005). Origins of depression in later life. *Psychological Medicine*, *35*(9), 1241–1252.

Brenner, L. A., Betthauser, L. M., Homaifar, B. Y., Villarreal, E., Harwood, J. E., & Huggins, J. A. (2011). Posttraumatic stress disorder, traumatic brain injury, and suicide attempt history among veterans receiving mental health services. *Suicide & Life-Threatening Behavior*, *41*(4), 416–423.

Brodaty, H., Luscombe, G., Parker, G., Wilhelm, K., Hickie, I., & Mitchell, P. (2001). Early and late onset depression in old age: Different aetiologies, same phenomenology. *Journal of Affective Disorders*, *66*(2–3), 225–236.

Bruce, M. L. (2001). Depression and disability in late life: Directions for future research. *American Journal of Geriatric Psychiatry*, *9*(2), 102–112.

Bruce, M. L., Ten Have, T. R., Reynolds, C. F., III, Katz, I. I., Schulberg, H. C., & Alexopoulos, G. S. (2004). Reducing suicidal ideation and depressive symptoms in depressed older primary care patients: A randomized controlled trial. *JAMA*, *291*(9), 1081–1091.

Bruce, M. L., McAvay, G. J., Raue, P. J., Brown, E. L., Meyers, B. S., & Weber, C. (2002). Major depression in elderly home health care patients. *The American Journal of Psychiatry*, *159*(8), 1367–1374.

Butters, M. A., Young, J. B., Lopez, O., Aizenstein, H. J., Mulsant, B. H., & Becker, J. T. (2008). Pathways linking late-life depression to persistent cognitive impairment and dementia. *Dialogues in Clinical Neuroscience*, *10*(3), 345–357.

Byers, A. L., Arean, P. A., & Yaffe, K. (2012). Low use of mental health services among older Americans with mood and anxiety disorders. *Psychiatric Services*, (63), 66–72.

Byers, A. L., & Yaffe, K. (2011). Depression and risk of developing dementia. *Nature Reviews Neurologica*, *7*(6), 323–331.

Byers, A. L., Yaffe, K., Covinsky, K. E., Friedman, M. B., Bruce, M. L., & Bruce, M. L. (2010). High occurrence of mood and anxiety disorders among older adults: The National Comorbidity Survey Replication. *Archives of General Psychiatry*, *67*(5), 489–496.

Camus, V., Kraehenbuhl, H., Preisig, M., Bula, C. J., & Waeber, G. (2004). Geriatric depression and vascular diseases: What are the links? *Journal of Affective Disorders*, *81*(1), 1–16.

Carnethon, M. R., Biggs, M. L., Barzilay, J. I., Smith, N. L., Vaccarino, V., & Siscovick, D. (2007). Longitudinal association between depressive symptoms and incident type 2 diabetes mellitus in older adults: The cardiovascular health study. *Archives of Internal Medicine*, *167*(8), 802–807.

Cassel, J. (1976). The contribution of the social environment to host resistance: The Fourth Wade Hampton Frost Lecture. *American Journal of Epidemiology*, *104*(2), 107–123.

Chang-Quan, H., Bi-Rong, D., Zhen-Chan, L., Yuan, Z., Yu-Sheng, P., & Qing-Xiu, L. (2009). Collaborative care interventions for depression in the elderly: A systematic review of randomized controlled trials. *Journal of Investigative Medicine: The Official Publication of the American Federation for Clinical Research*, *57*(2), 446–455.

Charney, D. S., Reynolds, C. F., III, Lewis, L., Lebowitz, B. D., Sunderland, T., Alexopoulos, G. S., et al., (2003). Depression and Bipolar Support Alliance consensus statement on the unmet needs in diagnosis and treatment of mood disorders in late life. *Archives of General Psychiatry*, *60*(7), 664–672.

Chen, M., Tse, L. A., Au, R. K., Yu, I. T., Wang, X. R., & Au, J. S. (2012). Mesothelioma and lung cancer mortality: A historical cohort study among asbestosis workers in Hong Kong. *Lung Cancer (Amsterdam, Netherlands)*, *76*(2), 165–170.

Cobb, S. (1976). Presidential Address-1976. Social support as a moderator of life stress. *Psychosomatic Medicine*, *38*(5), 300–314.

Cohen, C. I., Magai, C., Yaffee, R., & Walcott-Brown, L. (2005). Racial differences in syndromal and subsyndromal depression in an older urban population. *Psychiatric Services (Washington, DC)*, *56*(12), 1556–1563.

Cole, M. G., & Dendukuri, N. (2003). Risk factors for depression among elderly community subjects: A systematic review and meta-analysis. *American Journal of Psychiatry*, *160*(6), 1147–1156.

Conner, K. R., Conwell, Y., & Duberstein, P. R. (2001). The validity of proxy-based data in suicide research: A study of patients 50 years of age and older who attempted suicide. II. Life events, social support and suicidal behavior. *Acta Psychiatrica Scandinavica*, *104*(6), 452–457.

Conwell, Y., Duberstein, P. R., & Caine, E. D. (2002). Risk factors for suicide in later life. *Biological Psychiatry*, *52*(3), 193–204.

Conwell, Y., Duberstein, P. R., Hirsch, J. K., Conner, K. R., Eberly, S., & Caine, E. D. (2010). Health status and suicide in the second half of life. *International Journal of Geriatric Psychiatry*, *25*(4), 371–379.

Conwell, Y., Van Orden, K., & Caine, E. D. (2011). Suicide in older adults. *The Psychiatric Clinics of North America*, *34*(2), 451–468.

Crystal, S., Sambamoorthi, U., Walkup, J. T., & Akincigil, A. (2003). Diagnosis and treatment of depression in the elderly medicare population: Predictors, disparities, and trends. *Journal of the American Geriatrics Society*, *51*(12), 1718–1728.

Cuijpers, P., van Straten, A., & Smit, F. (2006). Psychological treatment of late-life depression: A meta-analysis of randomized controlled trials. *International Journal of Geriatric Psychiatry*, *21*(12), 1139–1149.

Dennis, M., Baillon, S., Brugha, T., Lindesay, J., Stewart, R., & Meltzer, H. (2007). The spectrum of suicidal ideation in Great Britain: Comparisons across a 16–74 years age range. *Psychological Medicine*, *37*(6), 795–805.

Djernes, J. K. (2006). Prevalence and predictors of depression in populations of elderly: A review. *Acta Psychiatrica Scandinavica*, *113*(5), 372–387.

Dombrovski, A. Y., Butters, M. A., Reynolds, C. F., III, Houck, P. R., Clark, L., & Szanto, K. (2008). Cognitive performance in suicidal depressed elderly: Preliminary report. *The American Journal of Geriatric Psychiatry*, *16*(2), 109–115.

Erlangsen, A., Zarit, S. H., & Conwell, Y. (2008). Hospital-diagnosed dementia and suicide: A longitudinal study using prospective, nationwide register data. *The American Journal of Geriatric Psychiatry*, *16*(3), 220–228.

Ferraro, K. F., & Farmer, M. M. (1996). Double jeopardy, aging as leveler, or persistent health inequality? A longitudinal analysis of white and black Americans. *The Journals of Gerontology. Series B: Psychological Sciences and Social Sciences*, *51*(6), S319–S328.

Flicker, L. (2008). Vascular factors in geriatric psychiatry: Time to take a serious look. *Current Opinion in Psychiatry*, *21*(6), 551–554.

Flicker, L. (2010). Cardiovascular risk factors, cerebrovascular disease burden, and healthy brain aging. *Clinics in Geriatric Medicine*, *26*(1), 17–27.

Forlani, C., Morri, M., Ferrari, B., Dalmonte, E., Menchetti, M., & Atti, A. R. (2014). Prevalence and gender differences in late-life depression: A population-based study. *The American Journal of Geriatric Psychiatry*, *22*(4), 370–380.

Fremouw, W. J., dePerczel, M., & Ellis, T. E. (1990). *Suicide risk: Assessment and response guidelines*. New York, NY: Pergamon Press.

Gallo, J. J., Cooper-Patrick, L., & Lesikar, S. (1998). Depressive symptoms of whites and African Americans aged 60 years and older. *The Journals of Gerontology. Series B: Psychological Sciences and Social Sciences*, *53*(5), P277–P286.

Gaynes, B. N., West, S. L., Ford, C. A., Frame, P., Klein, J., & Lohr, K. N. (2004). Screening for suicide risk in adults: A summary of the evidence for the U.S. Preventive Services Task Force. *Annals of Internal Medicine*, *140*(10), 822–835.

Gill, T. M., Desai, M. M., Gahbauer, E. A., Holford, T. R., & Williams, C. S. (2001). Restricted activity among community-living older persons: Incidence, precipitants, and health care utilization. *Annals of Internal Medicine*, *135*(5), 313–321.

De Groot, J. C., De Leeuw, F. E., Oudkerk, M., Hofman, A., Jolles, J., & Breteler, M. M. (2000). Cerebral white matter lesions and depressive symptoms in elderly adults. *Archives of General Psychiatry*, *57*(11), 1071–1076.

Gum, A. M., King-Kallimanis, B., & Kohn, R. (2009). Prevalence of mood, anxiety, and substance-abuse disorders for older Americans in the National Comorbidity Survey-Replication. *The American Journal of Geriatric Psychiatry*, *17*(9), 769–781.

Ha, J. H. (2010). The effects of positive and negative support from children on widowed older adults' psychological adjustment: A longitudinal analysis. *Gerontologist*, *50*(4), 471–481.

Ha, J. H., & Ingersoll-Dayton, B. (2011). Moderators in the relationship between social contact and psychological distress among widowed adults. *Aging & Mental Health*, *15*(3), 354–363.

Harman, J. S., Veazie, P. J., & Lyness, J. M. (2006). Primary care physician office visits for depression by older Americans. *Journal of General Internal Medicine*, *21*(9), 926–930.

Harris, T., Cook, D. G., Victor, C., DeWilde, S., & Beighton, C. (2006). Onset and persistence of depression in older people—results from a 2-year community follow-up study. *Age & Ageing*, *35*(1), 25–32.

Hasin, D. S., Goodwin, R. D., Stinson, F. S., & Grant, B. F. (2005). Epidemiology of major depressive disorder: Results from the National Epidemiologic Survey on Alcoholism and Related Conditions. *Archives of General Psychiatry*, *62*(10), 1097–1106.

Herrmann, L. L., Le Masurier, M., & Ebmeier, K. P. (2008). White matter hyperintensities in late life depression: A systematic review. *Journal of Neurology, Neurosurgery, and Psychiatry*, *79*(6), 619–624.

Hoptman, M. J., Gunning-Dixon, F. M., Murphy, C. F., Lim, K. O., & Alexopoulos, G. S. (2006). Structural neuroimaging research methods in geriatric depression. *The American Journal of Geriatric Psychiatry*, *14*(10), 812–822.

Huffman, J. C., Mastromauro, C. A., Beach, S. R., Celano, C. M., DuBois, C. M., & Januzzi, J. L. (2014). Collaborative care for depression and anxiety disorders in patients with recent cardiac events: The Management of Sadness and Anxiety in Cardiology (MOSAIC) randomized clinical trial. *JAMA Internal Medicine*, *174*(6), 927–935.

Hybels, C. F., & Blazer, D. G. (2003). Epidemiology of late-life mental disorders. *Clinics in Geriatric Medicine*, *19*(4), 663–696.

Hybels, C. F., Blazer, D. G., & Pieper, C. F. (2001). Toward a threshold for subthreshold depression: An analysis of correlates of depression by severity of symptoms using data from an elderly community sample. *Gerontologist*, *41*(3), 357–365.

Jang, Y., Borenstein, A. R., Chiriboga, D. A., & Mortimer, J. A. (2005). Depressive symptoms among African American and white older adults. *The Journals of Gerontology. Series B: Psychological Sciences and Social Sciences*, *60*(6), P313–P319.

Juurlink, D. N., Herrmann, N., Szalai, J. P., Kopp, A., & Redelmeier, D. A. (2004). Medical illness and the risk of suicide in the elderly. *Archives of Internal Medicine*, *164*(11), 1179–1184.

Katon, W. J., Lin, E., Russo, J., & Unutzer, J. (2003). Increased medical costs of a population-based sample of depressed elderly patients. *Archives of General Psychiatry*, *60*(9), 897–903.

Katon, W. J., Lin, E. H., Von Korff, M., Ciechanowski, P., Ludman, E. J., & McCulloch, D. (2010). Collaborative care for patients with depression and chronic illnesses. *The New England Journal of Medicine*, *363*(27), 2611–2620.

Kendler, K. S., Gardner, C. O., Gatz, M., & Pedersen, N. L. (2007). The sources of co-morbidity between major depression and generalized anxiety disorder in a Swedish national twin sample. *Psychological Medicine*, *37*, 453–462.

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, *62*(6), 593–602.

Kessler, R. C., Demler, O., Frank, R. G., Olfson, M., Pincus, H. A., & Zaslavsky, A. M. (2005). Prevalence and treatment of mental disorders, 1990 to 2003. *The New England Journal of Medicine*, *16*, *352*(24), 2515–2523. 352.

Klap, R., Unroe, K. T., & Unutzer, J. (2003). Caring for mental illness in the United States: A focus on older adults. *The American Journal of Geriatric Psychiatry*, *11*(5), 517–524.

Klap, R., Unroe, K. T., Unutzer, J., Klap, R., Unroe, K. T., & Unutzer, J. (2003). Caring for mental illness in the United States: A focus on older adults. *American Journal of Geriatric Psychiatry*, *11*(5), 517–524.

Kohout, F. J., Berkman, L. F., Evans, D. A., & Cornoni-Huntley, J. (1993). Two shorter forms of the CES-D (Center for Epidemiological Studies Depression) depression symptoms index. *Journal of Aging & Health*, *5*(2), 179–193.

Krishnan, K. R., Hays, J. C., & Blazer, D. G. (1997). MRI-defined vascular depression. *The American Journal of Psychiatry*, *154*(4), 497–501.

LaVeist, T. A. (2005). Disentangling race and socioeconomic status: A key to understanding health inequalities. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, *82*(2 Suppl. 3), iii26–34.

Lebowitz, B. D., Pearson, J. L., Schneider, L. S., Reynolds, C. F., III, Alexopoulos, G. S., & Parmelee, P. (1997). Diagnosis and treatment of depression in late life. Consensus statement update. *JAMA*, *278*(14), 1186–1190.

Lenze, E. (2003). Comorbidity of depression and anxiety in the elderly. *Current Psychiatry Reports*, *5*(1), 62–67.

Lenze, E. J., Mulsant, B. H., Shear, M. K., Alexopoulos, G. S., Frank, E., & Reynolds, C. F. (2001). Comorbidity of depression and anxiety disorders in later life. *Depression and Anxiety*, *14*(2), 86–93.

Lenze, E. J., Mulsant, B. H., Shear, M. K., Schulberg, H. C., Dew, M. A., & Begley, A. E. (2000). Comorbid anxiety disorders in depressed elderly patients. *American Journal of Psychiatry*, (157), 722–728.

Lichtenthal, W. G., Cruess, D. G., & Prigerson, H. G. (2004). A case for establishing complicated grief as a distinct mental disorder in DSM-V. *Clinical Psychology Review*, *24*(6), 637–662.

Liebetrau, M., Steen, B., & Skoog, I. (2008). Depression as a risk factor for the incidence of first-ever stroke in 85-year-olds. *Stroke*, *39*(7), 1960–1965.

Luoma, J. B., Martin, C. E., & Pearson, J. L. (2002). Contact with mental health and primary care providers before suicide: A review of the evidence. *The American Journal of Psychiatry*, *159*(6), 909–916.

Lyness, J. M., Cox, C., Curry, J., Conwell, Y., King, D. A., & Caine, E. D. (1995). Older age and the underreporting of depressive symptoms. *Journal of the American Geriatrics Society*, *43*(3), 216–221.

Lyness, J. M., Kim, J., Tang, W., Tu, X., Conwell, Y., & Caine, E. D. (2007). The clinical significance of subsyndromal

depression in older primary care patients. *American Journal of Geriatric Psychiatry*, *15*(3), 214–223.

Lyness, J. M., King, D. A., Cox, C., Yoediono, Z., & Caine, E. D. (1999). The importance of subsyndromal depression in older primary care patients: Prevalence and associated functional disability. *Journal of the American Geriatrics Society*, *47*(6), 647–652.

Mackenzie, C. S., El-Gabalawy, R., Chou, K. L., & Sareen, J. (2014). Prevalence and predictors of persistent versus remitting mood, anxiety, and substance disorders in a national sample of older adults. *The American Journal of Geriatric Psychiatry*, *22*(9), 854–865.

Mackenzie, C. S., Reynolds, K., Cairney, J., Streiner, D. L., & Sareen, J. (2012). Disorder-specific mental health service use for mood and anxiety disorders: Associations with age, sex, and psychiatric comorbidity. *Depression and Anxiety*, *29*(3), 234–242.

Mamdani, M. M., Parikh, S. V., Austin, P. C., & Upshur, R. E. (2000). Use of antidepressants among elderly subjects: Trends and contributing factors. *The American Journal of Psychiatry*, *157*(3), 360–367.

McIntosh, J. L., Santos, J. F., Hubbard, R. W., & Overholser, J. C. (1994). *Elder suicide: Research, theory, and treatment*. Washington, DC: American Psychological Association.

Medicare Improvements for Patients and Providers Act (July 15, 2008).

Metti, A. L., Cauley, J. A., Newman, A. B., Ayonayon, H. N., Barry, L. C., & Yaffe, K. (2013). Plasma beta amyloid level and depression in older adults. *The Journals of Gerontology. Series A: Biological Sciences and Medical Sciences*, *68*(1), 74–79.

Mezuk, B., Rock, A., Lohman, M. C., & Choi, M. (2014). Suicide risk in long-term care facilities: A systematic review. *International Journal of Geriatric Psychiatry*, *29*(12), 1198–1211.

Mitchell, A. J., Rao, S., & Vaze, A. (2010). Do primary care physicians have particular difficulty identifying late-life depression? A meta-analysis stratified by age. *Psychotherapy and Psychosomatics*, *79*(5), 285–294.

Mottram, P., Wilson, K., & Strobl, J. (2006). Antidepressants for depressed elderly. *Cochrane Database of Systematic Reviews (Online)* (1), CD003491.

Nagumey, A. J., Reich, J. W., & Newsom, J. (2004). Gender moderates the effects of independence and dependence desires during the social support process. *Psychology and Aging*, *19*(1), 215–218.

National Institute of Mental Health, (2015). Suicide in America: Frequently asked questions. <http://www.nimh.nih.gov/health/publications/suicide-in-america/index.shtml>. Accessed 05.05.15.

Older Americans, (2012). *Key indicators of well-being*. Hyattsville: Federal Interagency Forum on Aging-Related Statistics.

Ormel, J., Rijsdijk, F. V., Sullivan, M., van Sonderen, E., & Kempen, G. I. J. M. (2002). Temporal and reciprocal relationship between IADL/ADL disability and depressive symptoms in late life. *Journals of Gerontology. Series B: Psychological Sciences & Social Sciences*, *57*(4), P338–P347.

Oxman, T. E., Berkman, L. F., Kasl, S., Freeman, D. H., Jr., & Barrett, J. (1992). Social support and depressive symptoms in the elderly. *American Journal of Epidemiology*, *135*(4), 356–368.

Park, M., & Unutzer, J. (2011). Geriatric depression in primary care. *The Psychiatric Clinics of North America*, *34*(2), 469–487. ix–x.

Paykel, E. S., Weissman, M., Prusoff, B. A., & Tonks, C. M. (1971). Dimensions of social adjustment in depressed women. *The Journal of Nervous and Mental Disease*, *152*(3), 158–172.

Paykel, E. S., & Weissman, M. M. (1973). Social adjustment and depression. A longitudinal study. *Archives of General Psychiatry*, *28*(5), 659–663.

Pearlin, L. I., Lieberman, M. A., Menaghan, E. G., & Mullan, J. T. (1981). The stress process. *Journal of Health & Social Behavior*, *22*(4), 337–356.

Penninx, B. W., Geerlings, S. W., Deeg, D. J., Van Eijk, J. T., Van Tilburg, W., & Beekman, A. T. (1999). Minor and major depression and the risk of death in older persons. *Archives of General Psychiatry*, *56*(10), 889–895.

Penninx, B. W., Leveille, S., Ferrucci, L., Van Eijk, J. T., & Guralnik, J. M. (1999). Exploring the effect of depression on physical disability: Longitudinal evidence from the established populations for epidemiologic studies of the elderly. *American Journal of Public Health*, *89*(9), 1346–1352.

Pinquart, M., Duberstein, P. R., & Lyness, J. M. (2006). Treatments for later-life depressive conditions: A meta-analytic comparison of pharmacotherapy and psychotherapy. *The American Journal of Psychiatry*, *163*(9), 1493–1501.

Pompili, M., Sher, L., Serafini, G., Forte, A., Innamorati, M., & Girardi, P. (2013). Posttraumatic stress disorder and suicide risk among veterans: A literature review. *The Journal of Nervous and Mental Disease*, *201*(9), 802–812.

Prigerson, H. G., Frank, E., Kasl, S. V., Reynolds, C. F., III, Anderson, B., & Kupfer, D. J. (1995). Complicated grief and bereavement-related depression as distinct disorders: Preliminary empirical validation in elderly bereaved spouses. *The American Journal of Psychiatry*, *152*(1), 22–30.

Prigerson, H. G., Horowitz, M. J., Jacobs, S. C., Parkes, C. M., Aslan, M., & Maciejewski, P. K. (2009). Prolonged grief disorder: Psychometric validation of criteria proposed for DSM-V and ICD-11. *PLoS Medicine*, *6*(8), e1000121.

Sareen, J. (2011). Anxiety disorders and risk for suicide: Why such controversy? *Depression and Anxiety*, *28*(11), 941–945.

Schoevers, R. A., Smit, F., Deeg, D. J., Cuijpers, P., Dekker, J., & Beekman, A. T. (2006). Prevention of late-life

depression in primary care: Do we know where to begin? *The American Journal of Psychiatry*, *163*(9), 1611–1621.

Schwarzbach, M., Luppa, M., Forstmeier, S., Konig, H. H., & Riedel-Heller, S. G. (2014). Social relations and depression in late life-a systematic review. *International Journal of Geriatric Psychiatry*, *29*(1), 1–21.

Seignourel, P. J., Kunik, M. E., Snow, L., Wilson, N., & Stanley, M. (2008). Anxiety in dementia: A critical review. *Clinical Psychology Review*, *28*(7), 1071–1082.

Shanmugasegaram, S., Russell, K. L., Kovacs, A. H., Stewart, D. E., & Grace, S. L. (2012). Gender and sex differences in prevalence of major depression in coronary artery disease patients: A meta-analysis. *Maturitas*, *73*(4), 305–311.

Shear, M. K., Simon, N., Wall, M., Zisook, S., Neimeyer, R., & Keshaviah, A. (2011). Complicated grief and related bereavement issues for DSM-5. *Depression and Anxiety*, *28*(2), 103–117.

Sheline, Y. I., Price, J. L., Vaishnavi, S. N., Mintun, M. A., Barch, D. M., & McKinstry, R. C. (2008). Regional white matter hyperintensity burden in automated segmentation distinguishes late-life depressed subjects from comparison subjects matched for vascular risk factors. *The American Journal of Psychiatry*, *165*(4), 524–532.

Sher, L., Braquehaid, M. D., & Casas, M. (2012). Posttraumatic stress disorder, depression, and suicide in veterans. *Cleveland Clinic Journal of Medicine*, *79*(2), 92–97.

Silverstein, M., & Bengtson, V. L. (1994). Does intergenerational social support influence the psychological well-being of older parents? The contingencies of declining health and widowhood. *Social Science & Medicine*, *38*(7), 943–957.

Skarupski, K. A., Mendes de Leon, C. F., Bienias, J. L., Barnes, L. L., Everson-Rose, S. A., & Evans, D. A. (2005). Black-white differences in depressive symptoms among older adults over time. *The Journals of Gerontology. Series B: Psychological Sciences and Social Sciences*, *60*(3), P136–P142.

Smits, F., Smits, N., Schoevers, R., Deeg, D., Beekman, A., & Cuijpers, P. (2008). An epidemiological approach to depression prevention in old age. *The American Journal of Geriatric Psychiatry*, *16*(6), 444–453.

Sneed, J. R., Rindskopf, D., Steffens, D. C., Krishnan, K. R., & Roose, S. P. (2008). The vascular depression subtype: Evidence of internal validity. *Biological Psychiatry*, *64*(6), 491–497.

Sonnenberg, C. M., Beekman, A. T., Deeg, D. J., & van Tilburg, W. (2000). Sex differences in late-life depression. *Acta Psychiatrica Scandinavica*, *101*(4), 286–292.

Sonnenberg, C. M., Deeg, D. J., Comijs, H. C., van Tilburg, W., & Beekman, A. T. (2008). Trends in antidepressant use in the older population: Results from the LASA-study over a period of 10 years. *Journal of Affective Disorders*, *111*(2–3), 299–305.

Steffens, D. C., Krishnan, K. R., Crump, C., & Burke, G. L. (2002). Cerebrovascular disease and evolution of depressive symptoms in the cardiovascular health study. *Stroke*, *33*(6), 1636–1644.

Sun, X., Steffens, D. C., Au, R., Folstein, M., Summergrad, P., & Qiu, W. Q. (2008). Amyloid-associated depression: A prodromal depression of Alzheimer disease? *Archives of General Psychiatry*, *65*(5), 542–550.

Tai-Seale, M., McGuire, T., Colenda, C., Rosen, D., & Cook, M. A. (2007). Two-minute mental health care for elderly patients: Inside primary care visits. *Journal of the American Geriatrics Society*, *55*(12), 1903–1911.

Teodorczuk, A., O'Brien, J. T., Firbank, M. J., Pantoni, L., Poggesi, A., & Group, L. (2007). White matter changes and late-life depressive symptoms: Longitudinal study. *The British Journal of Psychiatry: The Journal of Mental Science*, *191*, 212–217.

Thibodeau, M. A., Welch, P. G., Sareen, J., & Asmundson, G. J. G. (2013). Anxiety disorders are independently associated with suicide ideation and attempts: Propensity score matching in two epidemiological samples. *Depression and Anxiety*, *30*(10), 947–954.

Thoits, P. A. (1995). Stress, coping, and social support processes: Where are we? What is next? *Journal of Health and Social Behavior*, 53–79.

Thomas, A. J., Kalaria, R. N., & O'Brien, J. T. (2004). Depression and vascular disease: What is the relationship? *Journal of Affective Disorders*, *79*(1–3), 81–95.

Thomas, A. J., Perry, R., Barber, R., Kalaria, R. N., & O'Brien, J. T. (2002). Pathologies and pathological mechanisms for white matter hyperintensities in depression. *Annals of the New York Academy of Sciences*, *977*, 333–339.

Umberson, D., Wortman, C. B., & Kessler, R. C. (1992). Widowhood and depression: Explaining long-term gender differences in vulnerability. *Journal of Health and Social Behavior*, *33*(1), 10–24.

Unutzer, J., Katon, W., Callahan, C. M., Williams, J. W., Jr., Hunkeler, E., & Langston, C. (2002). Collaborative care management of late-life depression in the primary care setting: A randomized controlled trial. *JAMA*, *288*(22), 2836–2845.

Unutzer, J., Katon, W., Williams, J. W., Jr., Callahan, C. M., Harpole, L., & Langston, C. A. (2001). Improving primary care for depression in late life: The design of a multicenter randomized trial. *Medical Care*, *39*(8), 785–799.

Unutzer, J., Patrick, D. L., Marmon, T., Simon, G. E., & Katon, W. J. (2002). Depressive symptoms and mortality in a prospective study of 2,558 older adults. *American Journal of Geriatric Psychiatry*, *10*(5), 521–530.

Unutzer, J., Simon, G., Pabiniak, C., Bond, K., & Katon, W. (1998). The treated prevalence of bipolar disorder in a large staff-model HMO. *Psychiatric Services (Washington, DC)*, *49*(8), 1072–1078.

U.S. Census Bureau, (2014). 65+ in the United States. Washington, DC: U.S. Government Printing Office.

Wakefield, J. C., & First, M. B. (2012). Validity of the bereavement exclusion to major depression: Does the empirical evidence support the proposal to eliminate the exclusion in DSM-5? *World Psychiatry*, *11*(1), 3–10.

Wolitzky-Taylor, K. B., Castriotta, N., Lenze, E. J., Stanley, M. A., & Craske, M. G. (2010). Anxiety disorders in older adults: A comprehensive review. *Depression and Anxiety*, *27*(2), 190–211.

Xiao, X., Liang, J., Bennett, J. M., Quinones, A. R., & Wen, Y. (2010). Ethnic differences in the dynamics of depressive symptoms in middle-aged and older Americans. *Journal of Aging and Health*, *22*(5), 631–652.