THE GERONTOLOGICAL SOCIETY OF AMERICA®

OXFORD

Original Article

Health Conditions and Passive Suicidal Ideation in the Survey of Health, Ageing, and Retirement in Europe

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Abstract

Objectives: To examine the associations between health conditions and passive suicidal ideation in middle-aged and older adults.

Method: Multivariate logistic regression analyses were conducted on data from 35,664 middle-aged and older adults from the Survey of Health, Ageing, and Retirement in Europe. Mediation analyses were also conducted to test the roles of disability and depression in risk of ideation.

Results: After including demographic variables, disability, depression, and other health conditions as covariates, heart attack, diabetes/high blood sugar, chronic lung disease, arthritis, ulcer, and hip/femoral fractures were associated with increased odds of passive suicidal ideation. When grouped by organ systems, conditions affecting the endocrine, respiratory, and musculoskeletal systems were associated with increased odds of passive suicidal ideation, as was the total number of conditions. Individuals with greater numbers of health conditions exhibited greater levels of disability and depression, which partially explained the increased risk of passive suicidal ideation among those with more health conditions.

Discussion: Certain specific health conditions, as well as total number of conditions, are associated with passive suicidal ideation in middle age and older adulthood. Health is a critical risk factor for suicidal ideation in late life and should be further studied in this particularly at-risk population.

Keywords: Depression—Health—Middle age—Older adult—Passive suicidal ideation

Suicide is a major public health issue that receives less-than-adequate attention in all age-groups but, especially, in middle-aged and older adults (Conwell, Van Orden, & Caine, 2011). In most parts of the world, suicide rates are highest in individuals 70 years and older, particularly among men (World Health Organization, 2014). The rate of suicide in European men in 2008 was 33.6/100,000 for middle-aged men and between 29.2 and 53.2 in older men (Värnik, 2012). In the United States, the highest rate of suicide is in men over age 65 (30.9/100,000; Centers for Disease Control and Prevention, National Center for Injury Prevention and Control, 2013). Around the world, the population is aging, leading to the expectation that numbers of

suicides will increase with time and making it even more important to identify risk factors that are relevant at these ages. The aim of the current study was to examine the associations between health conditions, disability, depression, and passive suicidal ideation in a comprehensive manner within a large, population-based sample.

Passive suicidal ideation (also referred to as death ideation) is defined as a wish to die, thinking about one's own death or that one would be better off dead, in comparison with active suicidal ideation, which refers to thoughts of killing oneself (Silverman, Berman, Sanddal, O'Carroll, & Joiner, 2007). The current study utilizes passive suicidal ideation as the outcome.

Although suicide rates are higher in middle-aged and older adults than in younger adults, suicidal ideation is actually less prevalent in these age-groups, and it has therefore been suggested that suicidal ideation is an even more crucial risk factor for suicide in older populations (Witte et al., 2006). Therefore, it is vital to identify potential risk factors for increased suicidal ideation in these age-groups. Some known risk factors for suicide in older adults are levels of social connectedness/support, health problems, disability, and psychiatric illnesses (Conwell et al., 2011). Whereas we know depression is the most well-established risk factor for suicide (Conwell et al., 2011), some health conditions are also associated with increased risk of suicidal ideation and behavior (reviewed by Fiske, O'Riley, & Widoe, 2008). It has also been reported that as an individual's number of health conditions increase, the risk of suicidal ideation increases (Scott et al., 2010).

The interpersonal theory of suicide (Joiner, 2005) conceptualizes suicide as an interaction between desire to die (i.e., passive or active suicidal ideation) and acquired capability to enact lethal self-harm. Furthermore, the theory posits that desire to die results from an interplay between interpersonal factors (thwarted belongingness and perceived burdensomeness). We suggest that specific health conditions could contribute to desire to die, for example, by leading to feelings of burdensomeness or propensity to disengage from activities, which may in turn lead to further isolation. More disabling conditions, such as stroke, Parkinson's disease, or fractures, may have this effect. Some types of health problems (e.g., diabetes that requires injections, as injecting substances have been found to be associated with suicide attempts/acquired capability independently of suicidal ideation among drug users; Cheek, Nestor, & Liu, 2015) could also increase the capability to enact lethal self-harm by habituating to pain or reducing fear of death. Therefore, it is critically important to identify health conditions associated with increased risk of suicidal ideation.

Studies that have examined the associations between health conditions and suicidal ideation have reported that conditions such as arthritis (e.g., Fuller-Thomson & Shaked, 2009), asthma (e.g., Goodwin et al., 2003), Parkinson's disease (e.g., Kostić et al., 2010), diabetes (e.g., Pompili et al., 2009), and cancer (e.g., Walker et al., 2008) are associated with suicidal ideation. These studies focused on only one health condition. Few studies have investigated individual health conditions in the same model, therefore adjusting for the existence of other health conditions. For example, in a mixed-age (over 18 years old) population-based cross-national study with a sample of almost 38,000, where they investigated the relation between specific health conditions and suicidal ideation, Scott and colleagues (2010) reported that heart disease, high blood pressure, heart attack/stroke, ulcer, arthritis, back and neck pain, headaches, other chronic pain, other respiratory conditions, and epilepsy were positively associated with suicidal ideation. Cancer, diabetes,

and allergies were not related to elevated risk of suicidal ideation. They controlled for the number of conditions and mental disorders (e.g., depression and anxiety). In a sample of over 900 men, Sanna and colleagues (2014) found that cancer, cardiovascular disease, musculoskeletal disease, and metabolic risk factors were not associated with suicidal ideation, whereas major vascular events (e.g., stroke), thyroid disorders, and syncope/seizures were significantly associated with ideation until depression was added to the model. Fewer of these studies have been completed specifically in middle-aged or older adult samples. In a sample of 365 primary care patients aged 65 and older, Kim and colleagues (2006) investigated the relation between reports of a "wish to die" and several health conditions, adjusting for a variety of covariates. Before adjustments, myocardial infarction, stroke, urinary incontinence, and falls within the past 6 months were positively associated with a wish to die. However, after controlling for demographics, level of functioning, and psychological status, only myocardial infarction remained statistically significant. Other studies have been completed that examined similar associations between health conditions and death by suicide rather than suicidal ideation (e.g., Erlangsen, Stenager, & Conwell, 2015). However, there are some distinctions between correlates of suicidal ideation and death by suicide (Joiner, 2005). Therefore, it is crucial to more comprehensively examine the associations between health conditions and suicidal ideation in middle-aged and older adults.

There are three main limitations of previous research in this area. First, most studies have focused on only one health condition, therefore not accounting for other factors such as additional health conditions or number of health conditions. Second, several of these studies were carried out in disease-specific samples, without healthy controls, or in small samples, therefore complicating the interpretation of results and comparison of risk for suicidal ideation in individuals with health conditions and those without. Third, many studies were conducted in mixed-age samples, which could mask true associations between disease and suicide ideation because, during younger ages, disease is not as prevalent as in middle-aged and older adult populations.

The possibility that depressive symptoms mediate the relation between health and suicidal ideation is rarely formally examined, despite its established role as a major risk factor for suicide (Conwell et al., 2011). Several of the studies listed above did not adjust for depression (e.g., Fuller-Thomson & Shaked, 2009; Pompili et al., 2009; Walker et al., 2008). A phenomenon found in several of those studies that did adjust for depression (e.g., Kim et al., 2006; Sanna et al., 2014), where the relation between various health conditions and suicidal ideation became smaller or nonsignificant after controlling for depression or other psychological problems, suggests an important mediating role for depression in these associations that remains to be formally examined. The role of disability as a mediator also

has not been formally examined. However, health conditions may negatively affect daily functioning, which may in turn exacerbate depressive symptoms and suicidal ideation. Fässberg and colleagues (2014) found that functional impairment (i.e., disability) was associated with suicidal ideation in older adults, even after controlling for depressive symptoms.

Due to the limitations of previous studies, the current study examines multiple chronic health conditions simultaneously within a large middle-aged and older adult sample, which can provide more information on the association between health and suicidal ideation in these populations. Moreover, there appear to be few studies investigating the relation between suicidal ideation and clusters of conditions (e.g., by affected organ systems, by similar symptoms, etc.). Examination of suicidal ideation by organ systems that are affected by health problems can be informative as to the association between types of symptoms and ideation. Also, health conditions affecting certain systems may be associated with suicidal ideation due to greater levels of disability (e.g., possibly the central nervous system, respiratory system, or circulatory system) or pain (e.g., the musculoskeletal system, neoplasms, or ulcers). Therefore, the current study also examines the role of groupings of conditions and tests disability as a mediator. Finally, the role of depression as a mediator is also specifically examined in this study.

The present study's aims are (a) to identify individual health conditions that are associated with increased risk of passive suicidal ideation in middle-aged and older adults; (b) to identify specific condition types (i.e., clustered by organ systems or type of pathology) in which problems are associated with passive suicidal ideation in middle-aged and older adults; (c) to determine whether reported diagnosis of a higher number of health conditions is associated with passive suicidal ideation in middle-aged and older adults; and (d) to explore the roles of disability and depressive symptoms as possible mediators of the association between health conditions and passive suicidal ideation in middle-aged and older adults. Data from Wave 2 of the population-based Survey of Health, Ageing, and Retirement in Europe (SHARE; Börsch-Supan et al., 2008) were used to examine the risk of passive suicidal ideation in relation to 17 health conditions: heart attack/congestive heart failure (CHF), high blood pressure/hypertension, high cholesterol, stroke/cerebrovascular disease (CVD), diabetes/high blood sugar, chronic lung disease, asthma, arthritis, osteoporosis, cancer, ulcer, Parkinson's disease, cataracts, hip/femoral fracture, other fractures, Alzheimer's disease/other dementia and benign tumor. Based on prior research (Fuller-Thomson & Shaked, 2009; Goodwin et al., 2003; Kim et al., 2006; Scott et al., 2010) and likely effects of these conditions on disability, pain, social factors (e.g., perceived burdensomeness and thwarted belongingness), and depression, we expect heart attack/CHF, high blood pressure/hypertension, stroke/CVD, chronic lung disease, asthma, arthritis, ulcer, hip/femoral fracture, and other fractures to be positively associated with passive suicidal ideation.

Method

Data

Data from 35,664 participants in Wave 2 of the SHARE were used in this study. SHARE is a multicultural cross-sectional publicly available large data set that was modeled after the Health and Retirement Study in the United States. SHARE includes health, socioeconomic, family and social relationship, and mental health data from individuals 50 years of age and older from 18 European countries (14 in Wave 2) as well as Israel. As of July 2011, SHARE received approval from the Ethics Committee of the University of Mannheim; however, reviews and approval are now obtained through the Ethics Council of the Max Planck Society for the Advancement of Science. We obtained approval for secondary data analysis from the SHARE coordination team and the West Virginia University Institutional Review Board. Information regarding study design, participating countries, and specific waves have been written about more extensively (see Börsch-Supan et al., 2008, 2013). In summary, data were collected using computer-aided personal interviews (CAPIs). We used data that were collected in 2006 and 2007 (i.e., Wave 2), and only included data from individuals who responded to the full SHARE survey. Wave 2 data were used for this study due to the addition of new countries, refreshment samples, and adults who turned 50 since Wave 1. Retention from Wave 1 was about 73%. Response rates for new countries and refreshment samples were 61% and 54%, respectively (Börsch-Supan et al., 2013).

The SHARE Wave 2 data set contained data on 36,730 participants. Participants with complete data were utilized in analyses. Of all participants, 1,066 (3%) were missing data on suicidal ideation, demographic variables, and/or health conditions, leaving complete data on 35,664 individuals. In the second step of analyses, 22 were missing data on disability, leaving complete data on 35,642, and at the third step, an additional 94 were missing total scores for depressive symptoms, leaving complete data on 35,548 (see details regarding treatment of missingness in Analyses and Sample Characteristics below).

Measures

Suicidal ideation
A single item ("In the last month, have you felt that you would rather be dead?") from the EURO-D (Prince et al., 1999; see description subsequently) was used for the current study's measure of passive suicidal ideation. Responses were coded as 0 (*not present*) and 1 (*any mention of suicidal feelings or wishing to be dead*).

Health conditions

Respondents were provided a list of 17 health conditions (heart attack/CHV, high blood pressure/hypertension, high blood cholesterol, stroke/CVD, diabetes/high blood sugar, chronic lung disease, asthma, arthritis, osteoporosis, cancer, ulcer, Parkinson's disease, cataracts, hip/femoral fracture, other fractures, Alzheimer's disease/other dementia, and benign tumor) and asked to indicate (yes/no format) whether or not a physician had ever told them they suffer from any of the listed health conditions. Health conditions were coded dichotomously, 0 = *no*; 1 = *yes*. Additionally, the number of health conditions for each participant was summed (range 0–17), with higher scores representing more health conditions. Lastly, modeled after ICD-10 categorizations, health conditions were organized into several clusters: (a) endocrine, nutritional, and metabolic diseases (diabetes/high blood sugar, high cholesterol); (b) diseases of the circulatory system (heart attack/CHV, high blood pressure/hypertension, stroke/CVD); (c) diseases of the respiratory system (chronic lung disease and asthma); (d) diseases of the musculoskeletal system and connective tissue, as well as injuries (arthritis, osteoporosis, hip/femoral fracture, and other fracture); (e) neoplasms (cancer or benign tumor); and (f) diseases of the central nervous system (Parkinson's disease and Alzheimer's disease). Two conditions (cataracts and ulcer) were not categorized with other groupings.

Depressive symptoms

The EURO-D is a 12-item screening device used to assess depressive symptomatology ([Prince et al., 1999](#)). Items ask about the presence of symptoms over the last month related to depression, pessimism, suicidality, guilt, sleep, interest, irritability, appetite, fatigue, concentration, enjoyment, and tearfulness. Items are dichotomous (0 = *no*, 1 = *yes*). The suicidal ideation item was excluded from the total because it is being used here as the outcome variables. Total scores range from 0 to 11, with higher scores indicating greater depressive symptoms. The analyses in this study were conducted on prorated depressive symptom scores. If a response on one item was missing, then that participant's score on the item was prorated by averaging their scores on the other depressive symptom items. Casewise deletion was used for cases where data on two or more depression items were missing. Analyses using only casewise deletion (i.e., any amount of missing data, including only one item) yielded very similar odds ratios (ORs), with identical patterns of statistical significance.

Disability

Disability was measured using a list of 13 activities of daily living (ADLs) and instrumental activities of daily living (IADLs). Participants reported whether they experienced difficulties with each of the activities (1 = *difficulty with activity*, 0 = *no difficulty with activity*). Scores on the ADLs and IADLs were summed, such that higher scores represent greater impairment in ADLs and IADLs. All participants missing data on disability (*n* = 22) were missing all items, so no proration was utilized.

Demographic characteristics

Age, gender, marital status, and education were also used as covariates in the analyses. Month and year of birth and month and year of interview were used to determine age at the time of the interview. Gender was coded dichotomously (0 = female, 1 = male). Marital status was coded such that 1 = married or in a registered partnership; 2 = married but living separately (treated as separated), or divorced; 3 = never married; and 4 = widowed. For analyses, these were dummy coded with married/in a registered partnership as the reference group. Finally, participants reported the total number of years of education they had obtained.

Analyses

Binary multiple logistic regression analyses were used to examine the association between health conditions and passive suicidal ideation. Analyses were first estimated including only age, gender, marital status, and years of education as covariates and including all 17 health conditions. Analyses were then estimated again with disability added as a covariate and then adding depressive symptoms as a covariate. The same strategy was used to determine which clusters of health conditions (i.e., organ systems) were related to suicidal ideation. Additionally, a count variable was generated for a number of health conditions and used to determine whether the number of health conditions was related to increased odds of endorsing passive suicidal ideation. To explore the possible interactions with age and gender, separate logistic regressions were run for the individual health conditions, organ systems, and total condition count to test for interactions with age and with gender. All logistic regression analyses were completed using SAS 9.4 statistical software ([SAS Institute Inc., 2002–2004](#)).

Finally, to explore the roles of depressive symptoms and disability as possible explanatory variables for the association between specific health conditions and passive suicidal ideation, mediation analyses were performed using Mplus 6.0 software ([Muthén & Muthén, 1998–2010](#)). We utilized a structural equation modeling framework with a maximum likelihood robust estimator and Monte Carlo integration to calculate indirect and total effects. All mediation effects were adjusted for age, gender, education, and marital status.

Results

Sample Characteristics

Demographic characteristics and sample sizes, as well as frequencies of endorsement of each of the health conditions and the passive suicidal ideation item, are presented in [Table 1](#). In regard to missing data, those with missingness on model variables reported suicidal ideation somewhat

Table 1. SHARE Wave 2 (2006–2007) Sample Characteristics

Variable	M (SD)	n (%)
Age	64.88 (10.27)	
Gender (female)		19,893 (55.8%)
Years of education	10.20 (4.56)	
Marital status		
Married		26,018 (72.9%)
Divorced/separated		2,761 (7.7%)
Never married		1,713 (4.8%)
Widowed		5,172 (14.5%)
Passive suicidal ideation (endorsed)		2,379 (6.7%)
Disability[a]	0.65 (1.88)	
Depressive symptoms[b]	2.95 (1.99)	
Total number of conditions	1.50 (1.51)	
Heart attack/other heart problem		4,401 (12.3%)
High blood pressure/hypertension		12,518 (35.1%)
High blood cholesterol		7,796 (21.9%)
Stroke/cerebrovascular disease		1,200 (3.4%)
Diabetes/high blood sugar		3,975 (11.2%)
Chronic lung disease		1,771 (5.0%)
Asthma		1,794 (5.0%)
Arthritis/rheumatism		7,371 (20.7%)
Osteoporosis		3,006 (8.4%)
Cancer/malignant tumor		1,432 (4.0%)
Ulcer		1,715 (4.8%)
Parkinson's disease		240 (0.7%)
Cataracts		2,561 (7.2%)
Hip/femoral fracture		653 (1.8%)
Other fracture		1,662 (4.7%)
Alzheimer's disease/dementia		348 (1.0%)
Benign tumor		896 (2.5%)
Organ systems		
Circulatory		
1 Condition		12,018 (33.7%)
2 Conditions		2,659 (7.5%)
3 Conditions		261 (0.7%)
Endocrine		
1 Condition		8,619 (24.2%)
2 Conditions		1,576 (4.4%)
Respiratory		
1 Condition		2,673 (7.5%)
2 Conditions		446 (1.3%)
Musculoskeletal		
1 Condition		8,418 (23.6%)
2 Conditions		1,721 (4.8%)
3 Conditions		248 (0.7%)
4 Conditions		22 (0.1%)
Neoplasms		
1 Condition		2,152 (6.0%)
2 Conditions		88 (0.3%)
Central nervous system		
1 Condition		536 (1.5%)
2 Conditions		26 (0.1%)

Notes. ADLs = activities of daily living; IADLs = instrumental activities of daily living. Total *n* = 35,664. For disability (ADLs and IADLs) scores, *n* = 35,642. For depressive symptom (EURO-D) scores, *n* = 35,548.
[a]Disability scores range from 0 to 13.
[b]Depressive symptom (EURO-D) scores range from 0 to 11.

more frequently, somewhat higher levels of depression, and somewhat higher numbers of conditions than those who had complete data and were included in the analyses (see Supplementary Appendix A). Multiple imputation was used for sensitivity analyses regarding missing data, with all variables but marital status being imputed. With the imputed data, results of the main models were nearly identical. For ease of interpretation and because there was a low overall percentage of missingness, results without imputation are reported here.

Logistic Regression Analyses

Logistic regression analyses were conducted to assess the association between reported physician diagnosis of the individual physical health conditions and passive suicidal ideation. Results of the following analyses are displayed in Table 2. Analyses were first conducted controlling only for age, gender, marital status, and years of education. At this level, all individual conditions except for high blood pressure, high blood cholesterol, cataracts, and benign tumor were significantly associated with higher odds of suicidal ideation. Parkinson's disease and Alzheimer's disease/dementia exhibited the strongest associations with an increased odds of passive suicidal ideation. Next, disability was added to the model, and the associations between osteoporosis and Alzheimer's disease and passive suicidal ideation became nonsignificant, whereas those between high cholesterol and benign tumors and passive suicidal ideation became significant. Finally, depressive symptoms were added into the model. The following conditions were significantly associated with higher odds of passive suicidal ideation: heart attack, diabetes/high blood sugar, chronic lung disease, arthritis, ulcer, and hip or femoral fracture. Notably, high cholesterol, stroke, asthma, osteoporosis, cancer, Parkinson's disease, other fracture, and Alzheimer's disease were no longer significantly associated with greater odds of suicidal ideation with both disability and depressive symptoms in the model.

Additional logistic regression analyses were conducted to examine the association between the number of conditions affecting any given organ system and passive suicidal ideation. These analyses were first conducted controlling only for age, gender, marital status, and years of education. All organ systems were significantly associated with increased odds of passive suicidal ideation at this level, with conditions affecting the central nervous system exhibiting the strongest associations with ideation. Next, disability was added as a covariate. All associations between organ systems and passive suicidal ideation remained significant, though the OR for central nervous system conditions decreased a notable amount. Finally, depressive symptoms were added as a covariate. At this level, greater numbers of conditions affecting the endocrine, respiratory, and musculoskeletal systems were significantly associated with

Table 2. Logistic Regression Results—Odds of Passive Suicidal Ideation (0 = *no*, 1 = *yes*) in Relation to Health Conditions

Variable	First model OR	First model 95% CI	Second model OR	Second model 95% CI	Third model OR	Third model 95% CI
Individual conditions						
Age	1.01**	1.00–1.01	1.00	0.99–1.00	1.01***	1.01–1.02
Gender	0.67***	0.61–0.74	0.69***	0.62–0.76	0.94	0.85–1.05
Years of education	0.98***	0.97–0.99	0.99*	0.98–1.00	1.01*	1.00–1.02
Divorced/separated[a]	1.90***	1.64–2.19	1.86***	1.61–2.15	1.87***	1.60–2.18
Never married[a]	1.46***	1.20–1.77	1.41***	1.15–1.72	1.40**	1.13–1.73
Widowed[a]	1.78***	1.59–2.00	1.71***	1.52–1.93	1.66***	1.47–1.89
Disability			1.23***	1.20–1.25	1.09***	1.07–1.11
Depressive symptoms					1.68***	1.64–1.72
Heart attack/other heart problem	1.57***	1.40–1.75	1.41***	1.26–1.58	1.19**	1.06–1.35
High blood pressure/hypertension	1.03	0.94–1.13	1.04	0.94–1.14	0.95	0.86–1.05
High blood cholesterol	1.09	0.99–1.21	1.13*	1.02–1.25	1.06	0.95–1.18
Stroke/cerebrovascular disease	1.78***	1.50–2.12	1.24*	1.03–1.49	1.03	0.84–1.25
Diabetes/high blood sugar	1.52***	1.35–1.71	1.40***	1.24–1.58	1.21**	1.07–1.38
Chronic lung disease	1.60***	1.37–1.87	1.48***	1.26–1.74	1.23*	1.04–1.46
Asthma	1.35***	1.14–1.58	1.25**	1.06–1.48	1.14	0.95–1.36
Arthritis/rheumatism	1.58***	1.43–1.74	1.46***	1.33–1.62	1.13*	1.02–1.25
Osteoporosis	1.19**	1.04–1.36	1.13	0.99–1.29	0.92	0.80–1.06
Cancer/malignant tumor	1.57***	1.32–1.88	1.53***	1.28–1.84	1.11	0.92–1.35
Ulcer	1.66***	1.42–1.95	1.54***	1.32–1.81	1.23*	1.04–1.46
Parkinson's disease	2.64***	1.91–3.67	1.61**	1.14–2.28	1.41	0.98–2.04
Cataracts	1.13	0.99–1.30	1.08	0.93–1.25	1.02	0.88–1.19
Hip/femoral fracture	1.74***	1.39–2.18	1.33*	1.05–1.69	1.36*	1.06–1.75
Other fracture	1.30**	1.10–1.54	1.22*	1.03–1.45	1.17	0.97–1.40
Alzheimer's disease/dementia	2.47***	1.88–3.24	1.11	0.82–1.49	0.90	0.66–1.22
Benign tumor	1.25	0.99–1.56	1.28*	1.02–1.61	1.16	0.91–1.47
	$\chi^2 = 1,380.99$***, $df = 23$[b]		$\chi^2 = 1,803.33$***, $df = 24$[b]		$\chi^2 = 3,972.80$***, $df = 25$[b]	
Condition groups						
Age	1.01***	1.01–1.02	0.99	0.99–1.00	1.01***	1.01–1.02
Gender	0.71***	0.64–0.78	0.71***	0.65–0.79	0.98	0.88–1.09
Years of education	0.98***	0.97–0.99	0.99*	0.98–1.00	1.01*	1.00–1.02
Divorced/separated[a]	1.92***	1.66–2.21	1.87***	1.62–2.16	1.88***	1.61–2.19
Never married[a]	1.46***	1.20–1.78	1.41***	1.16–1.72	1.40**	1.14–1.73
Widowed[a]	1.78***	1.59–2.00	1.71***	1.51–1.92	1.66***	1.47–1.89
Disability			1.23***	1.21–1.26	1.10***	1.07–1.12
Depressive symptoms					1.68***	1.64–1.72
Circulatory	1.29***	1.22–1.38	1.18***	1.11–1.26	1.04	0.97–1.11
Endocrine	1.23***	1.15–1.32	1.23***	1.14–1.32	1.11**	1.03–1.20
Respiratory	1.48***	1.35–1.63	1.37***	1.24–1.52	1.19**	1.07–1.32
Musculoskeletal	1.41***	1.33–1.50	1.29***	1.22–1.38	1.08*	1.02–1.16
Neoplasms	1.44***	1.26–1.64	1.43***	1.25–1.64	1.14	0.98–1.31
Central nervous system	2.63***	2.16–3.21	1.27*	1.02–1.58	1.06	0.84–1.34
Ulcer	1.67***	1.43–1.95	1.55***	1.32–1.81	1.24*	1.05–1.47
Cataracts	1.14	0.99–1.31	1.08	0.94–1.25	1.03	0.88–1.20
	$\chi^2 = 1302.46$***, $df = 14$[b]		$\chi^2 = 1766.43$***, $df = 15$[b]		$\chi^2 = 3950.02$***, $df = 16$[b]	
Total condition count						
Age	1.01***	1.01–1.02	1.00	0.99–1.00	1.01***	1.01–1.02
Gender	0.71***	0.64–0.78	0.71***	0.64–0.78	0.98	0.89–1.09
Years of education	0.98***	0.97–0.99	0.99*	0.98–1.00	1.01*	1.00–1.02
Divorced/separated[a]	1.94***	1.68–2.24	1.90***	1.65–2.19	1.89***	1.62–2.21
Never married[a]	1.48***	1.21–1.79	1.42***	1.17–1.73	1.41**	1.15–1.74

Table 2. *Continued*

Variable	First model		Second model		Third model	
	OR	95% CI	OR	95% CI	OR	95% CI
Widowed[a]	1.79***	1.59–2.00	1.70***	1.51–1.92	1.66***	1.47–1.89
Disability			1.23***	1.21–1.25	1.09***	1.07–1.12
Depressive symptoms					1.68***	1.65–1.72
Total count	1.35***	1.32–1.39	1.26***	1.23–1.29	1.09***	1.06–1.12
	χ^2 = 1234.31***, df = 7[b]		χ^2 = 1743.75***, df = 8[b]		χ^2 = 3942.56***, df = 9[b]	

Notes. OR = odds ratio; CI = confidenceinterval; SHARE = Survey of Health, Ageing and Retirement in Europe. Data from the SHARE Wave 2 (2006–2007). In the first model, age, gender, marital status, and years of education are included as covariates, and all 17 health conditions or all organ system groupings are entered into the model to predict passive suicidal ideation. In the second model, disability is added as a covariate, and in the third model, depression is added as a covariate. Endorsed passive suicidal ideation = 1; male gender = 1; endorsed condition = 1.
[a]Reference group is married.
[b]Likelihood ratio for model, df = degrees of freedom.
*$p < .05$. **$p < .01$. ***$p < .001$.

higher odds of suicidal ideation. Neoplasms (cancerous and benign tumors) and conditions affecting the circulatory and central nervous systems were no longer significantly associated with ideation.

Finally, logistic regression analyses were conducted to address the hypothesis that a greater total number of diagnoses would be associated with greater odds of passive suicidal ideation. These analyses were first run controlling only for age, gender, marital status, and years of education, followed by adding disability, and then depressive symptoms as covariates. The hypothesis was supported (see Table 2).

We also conducted supplementary analyses on the interactions between the conditions, condition groupings, or total condition count and age or gender, including all covariates. There were significant interactions between gender and asthma (OR = 0.66, 95% confidence interval [CI] = 0.46–0.96, p = .03) and gender and respiratory conditions (OR = 0.91, 95% CI = 0.85–0.98, p = .01). When respiratory condition counts were higher, women had slightly greater odds of passive suicidal ideation compared with men.

Interaction analyses were conducted in regard to age in years as well and yielded significant interactions between age and ulcers (OR = 0.82, 95% CI = 0.70–0.95, p = .01), age and musculoskeletal conditions (OR = 0.96, 95% CI = 0.93–0.99, p = .02), and age and total condition count (OR = 0.96, 95% CI = 0.92–0.99, p = .02). Younger age was associated with a slightly increased probability of passive suicidal ideation when ulcers were present compared with older age. Older age was associated with a slightly higher probability of passive suicidal ideation at greater numbers of musculoskeletal conditions or greater total count of conditions. To explore the differences between middle-aged (under age 65) and older (aged 65 and older) adults in this sample, the logistic regression analyses with depressive symptoms as a covariate were conducted separately in each age-group. The results appear in Supplementary Table 1.

Likely partly due to issues relating to power (i.e., few participants in some cells), some conditions (heart attack, diabetes/high blood sugar, and hip/femoral fracture) were significantly associated with higher odds of passive suicidal ideation in older adults but not in middle-aged adults. Ulcer and other fracture were significantly associated with higher odds of passive suicidal ideation in middle-aged adults but not older adults.

Mediation Analyses

Analyses were conducted to statistically test whether depressive symptoms or disability mediated any of the effects between health conditions and risk of reported passive suicidal ideation, adjusting for age, gender, marital status, and education. Both depression and disability were tested simultaneously as mediators. Due to the large number of single health conditions and resulting increases in familywise alpha levels, we did not conduct mediation analyses for each individual condition. First, we examined the effect of the chronic condition count as the main predictor. Significant effects emerged for the total (b = 0.48; 95% CI = 0.44–0.52; p = .001), depression indirect (b = 0.31; 95% CI = 0.29–0.33; p = .001), and disability indirect (b = 0.04; 95% CI = 0.03–0.05; p = .001) pathways. Those with a higher chronic condition count endorsed both higher levels of depression and disability, and those with higher levels of depression and disability had a greater odds of passive suicidal ideation. Generally, depression had a stronger mediating effect than disability likely due to the fact that depression (OR = 2.80; 95% CI = 2.68–2.93; p = .001) was a much stronger predictor of passive suicidal ideation compared with disability (OR = 1.20; 95% CI = 1.15–1.24; p = .001). Next, we tested depressive symptoms and disability as mediators between each of the health condition groupings and passive suicidal ideation in separate models. All indirect effects were statistically significant (see Table 3 for mediation results), suggesting both

Table 3. Mediational Analyses—Depression and Disability as Mediators of Association Between Condition Groups and Passive Suicidal Ideation

Organ system	Total effect		Indirect effect: Depression		Indirect effect: Disability	
	b (95% CI)	*p* Value	*b* (95% CI)	*p* Value	*b* (95% CI)	*p* Value
Circulatory	0.25 (0.20–0.29)	.001	0.17 (0.15–0.18)	.001	0.03 (0.02–0.03)	.001
Endocrine	0.21 (0.16–0.25)	.001	0.12 (0.11–0.14)	.001	0.01 (0.01–0.02)	.001
Respiratory	0.21 (0.17–0.25)	.001	0.13 (0.11–0.14)	.001	0.02 (0.01–0.02)	.001
Neoplasms	0.14 (0.10–0.18)	.001	0.09 (0.09–0.11)	.001	0.01 (0.01–0.02)	.001
Muscular	0.31 (0.27–0.35)	.001	0.22 (0.20–0.23)	.001	0.03 (0.02–0.03)	.001
Central nervous system	0.19 (0.15–0.23)	.001	0.12 (0.11–0.14)	.001	0.07 (0.05–0.08)	.001

depressive symptoms and disability partly explain the association between a variety of health conditions and passive suicidal ideation.

Discussion

We examined the association between several health conditions and passive suicidal ideation in middle- and older adulthood. The results generally supported past research on individual conditions in older adulthood while also including informative analyses on conditions that have not been as extensively studied and on how the particular organ systems affected are related to passive suicidal ideation. After controlling for disability and depressive symptoms, as well as age, gender, marital status, education, and the other health conditions, heart attack, diabetes, chronic lung disease, arthritis, ulcer, and hip/femoral fractures were associated with higher odds of passive suicidal ideation. In addition, we found that greater numbers of conditions affecting the circulatory, respiratory, and musculoskeletal systems were associated with suicidal ideation and that an overall greater number of diagnoses was also associated with passive suicidal ideation. Analyses of the roles of disability and depression as mediators revealed a consistent pattern, where disability and depression mediated the association between greater count of conditions and greater odds of suicidal ideation. Individuals experiencing higher levels of disability and a greater number of health conditions exhibited greater levels of depression, which partially explains why those with more health conditions had an increased risk of passive suicidal ideation.

The findings on the conditions associated with risk of suicidal ideation are mainly consistent with past research in this area. In a population-based study of participants aged 18 and older, Scott and colleagues (2010) found that heart attack or stroke and ulcer were related to higher odds of ideation. Additionally, in a sample of older adults, Kim and colleagues (2006) found that myocardial infarction, stroke, and falls were associated with wishes to die. Due to the paucity of studies on health conditions and suicidal ideation in older adults, it may also be helpful to compare with studies examining death by suicide. Juurlink, Herrmann, Szalai, Kopp, and Redelmeier (2004) found that CHV and

chronic obstructive lung disease were associated with death by suicide in older adults. In none of these three studies was cancer associated with a significantly increased risk of suicidal ideation, attempts, or death by suicide, consistent with the current study's result. These types of null findings may result from the categorization of a diverse group of conditions. Cancer may affect a variety of organ systems, may be diagnosed at different levels of severity or stages, and may affect functioning to varying degrees. The type, stage, and prognosis may be more influential in the occurrence of suicidal ideation.

The significant association between diabetes and increased odds of suicidal ideation contrasts with the nonsignificant associations found in other studies examining suicidal ideation and planning in all-age samples (Scott et al., 2010) and death by suicide in older samples (Juurlink et al., 2004). The current findings may differ from those in all-age samples due to the more specific focus here on middle and older age, whereas they may contrast with the findings regarding death by suicide due to a distinction between ideation and death by suicide. These discrepancies should be tested in further research to determine the effect of diabetes on differing types of suicidal behavior in older adults.

The nonsignificant association between Parkinson's disease and suicidal/death ideation was inconsistent with past studies, which indicate that large proportions of individuals with Parkinson's disease experience suicidal ideation. Kostić and colleagues (2010) found that the high prevalence of suicidal or death ideation or death by suicide in a sample of people with Parkinson's disease was not significantly associated with Parkinson's symptoms but more strongly associated with psychiatric symptoms, such as depression. Our findings somewhat differ in that the reported diagnosis of Parkinson's disease continues to be significantly related to ideation, but to a much lesser extent, when disability is included as a covariate, and this association becomes nonsignificant when depressive symptoms are also added. This may be due to the difference in design—the current study compared individuals with Parkinson's disease to those without Parkinson's disease in a very large population-based sample while also taking into account other health conditions and risk factors for suicidal ideation. Kostić and

colleagues (2010) utilized a smaller sample of individuals with Parkinson's disease without a comparison group, therefore not making it possible to determine the overall effect of a diagnosis of Parkinson's disease. The current study offers a more complete picture of the role Parkinson's disease plays in comparison with other health problems.

In this study, arthritis also was associated with ideation. This was consistent with past findings in all-age samples (e.g., Fuller-Thomson & Shaked, 2009), suggesting that this particular association remains relevant into later life and pointing to the need to put more effort into treating arthritis and its associated psychological outcomes as risk for arthritis increases with advanced age.

The nonsignificant association between Alzheimer's disease/dementia and suicidal ideation after including depression in this study may help to clarify the mixed findings in previous studies on the topic, as reviewed by Haw, Harwood, and Hawton (2009). Whereas some studies have reported that dementia is not associated with suicidal ideation after controlling for mood or depression, others have found that an association does remain after taking depression into account. In the current study with a large middle-aged and older adult sample, dementia is no longer associated with suicidal ideation when depression and other health conditions are included in the model. In this case, it appears that depression mainly mediates the association between dementia and suicidal ideation. See subsequently for further discussion of depression as a mediator.

There is little research on the associations between problems affecting particular organ systems and suicidal ideation. In Scandinavia, Waern and colleagues (2002) examined physical illness burden by organ system in relation to death by suicide in older adults and found that neurological problems (mainly stroke) and impaired vision were associated with suicide, whereas illness of the heart, vascular, respiratory, gastrointestinal, renal, musculoskeletal, and endocrine systems were not associated with suicide. Waern and colleagues (2002), however, did not examine suicidal ideation, for which associations may differ, as they did in the present study. Here, the associations between visual conditions (i.e., cataracts) and central nervous system conditions and suicidal ideation were not significant, whereas the associations of suicidal ideation with the circulatory, respiratory, and musculoskeletal systems were significant. Given that these conditions become more common as individuals age, this is an important finding and one that merits further exploration in future research on suicide in older age.

The current findings reveal that disability and depressive symptoms partially mediate the association between health and suicidal ideation. There has not been much direct examination of the roles of these variables as mediators before now, but it is evident from past research, where depression is consistently included as a covariate, that depression has been considered an influence in the increased risk of suicidal ideation with certain health conditions. However, the findings of the logistic regression models controlling for disability and depressive symptoms, which reveal that some conditions are still associated with greater risk of suicidal/death ideation even after disability and depression are included, also point to the additional explanatory power that certain illnesses may have on risk of suicidal ideation beyond these mediators. This may occur through various other mediators, such as those suggested by theories of suicide such as the interpersonal theory (Joiner, 2005). For example, increased disability from health conditions such as a fracture or stroke may contribute to social isolation and thwarted belongingness as well as feelings of burdensomeness, therefore increasing the risk of suicidal ideation. In addition, the strategies that individuals use to cope with disability due to illness, including seeking help and support, may play a role in the risk for suicidal ideation (Fiske & O'Riley, in press). Decreased help-seeking behavior may also be associated with thwarted belongingness or perceived burdensomeness, therefore increasing the risk of suicidal ideation and/or increasing the risk of attempts or death once ideation occurs. More research must be done to explore what other mediating factors (e.g., social support and help seeking) may be involved in the complex association between health conditions and suicidal ideation. These types of factors may also help explain differences between individual health conditions or affected organ systems in how strongly they are associated with increased risk of suicidal ideation. These differences by health conditions have yet to be thoroughly examined in research.

Whereas some strengths of the current study included its particular focus on the upper-middle-age and older adult population, one which has been often overlooked in the past suicide research (Conwell et al., 2011), and its large population-based, multinational sample, it also has some limitations. First, the measure of suicidal/death ideation was a single item taken from the EURO-D. Although this is a method used quite commonly in suicide literature and supported by research examining the validity of responses to these single items (e.g., Desseilles et al., 2012), suicidal ideation may be more accurately measured in future research using multi-item validated suicidal ideation questionnaires. An additional limitation is the possibility of cognitive impairment in this sample, due to the ages of the participants, and therefore inaccurate self-report of health conditions or depressive symptoms. Proxy interviews were not used in SHARE for the depression questionnaire, from which depression scores and the suicidal/death ideation items were taken, but were allowed for the physical health portion of the interviews (SHARE, 2013). If cognitive impairment was present in respondents, this may lead to underreporting of symptoms. Third, the analyses conducted in this study utilized cross-sectional data as the first step in defining the associations between health conditions and suicidal ideation in later life. To determine the temporal and causal relations between diagnosis, onset or worsening of disability, depression, and suicidal ideation in this age-group, longitudinal analyses would be necessary. The current analyses also did not include the timing of diagnosis of the health conditions or severity of the health

conditions, and it relies on self-report, and is therefore not a precise measure of current health burden. In addition, the presence of a history of multiple health conditions may be associated with third variables (e.g., personality; Hampson & Friedman, 2008) that are also associated with disability, depression, and suicidal ideation. This study also grouped together participants from several countries, a strategy that has both benefits and limitations. This strategy allows for a larger, population-based sample. However, there may be cultural and other differences (e.g., differences in access to health care; attitudes toward illness, disability, and seeking treatment; public and private support systems; and welfare for disabled or chronically ill individuals) between participants from separate countries, which could affect the results. Finally, as prominent theories of suicide, such as the interpersonal theory of suicide (Joiner, 2005), suggest, suicidal ideation and death by suicide have some unique characteristics from each other (e.g., acquired capability to enact self-harm), and further research should expand on these findings regarding suicidal ideation to further study the associations between health conditions and suicide attempts or death by suicide.

The results of this study point to further areas for future research that can continue to define health-related risk factors for suicide in middle-aged and older adults. Longitudinal studies on large samples, such as SHARE and other national data sets, can provide the most definitive information about the effects of these and other specific health conditions on depression and suicidal ideation. In addition, it will be crucial in future research to examine the effects of mediators and moderators in these associations. In this study, we conducted some analyses on disability and depression as mediators. Other possible mediators or moderators may include levels of discomfort or pain caused by the conditions, severity of the condition, time since diagnosis, social support, strategies used to cope with illness and disability, and the factors of the interpersonal theory of suicide (perceived burdensomeness and thwarted belongingness). We were unable to test these mediators and moderators due to the limitation of measures included in the SHARE study.

Despite the limitations of this study and areas for further investigation, these results in combination with previous research point to important implications for practice and policy. The associations between chronic health conditions and passive suicidal ideation, as well as the mediating role of depressive symptoms, strongly suggest that middle-aged and older adults who are diagnosed with chronic conditions should be screened for depression early and often. As has been demonstrated in several studies, older adults are most likely to visit their primary care providers shortly before they die by suicide (e.g., Luoma, Martin, & Pearson, 2002). These findings suggest that older adults with chronic health conditions should be regularly screened and treated for depression when they visit their primary care providers.

Suicide in middle age and late life is a topic that is often underrepresented in research, and what past research has been conducted has shown that health at this age is relevant in the understanding of suicide. We examined the associations between health conditions in middle and older adulthood and suicidal/death ideation and found that certain conditions, organ systems, and overall count of diagnoses are related to increased odds of suicidal ideation. The results supported and added to past research on health in late life and its relation to suicide while also highlighting important areas for future research.

Supplementary Material

Supplementary material can be found at: http://psych-socgerontology.oxfordjournals.org/

References

Börsch-Supan, A., Brugiavini, A., Jürges, H., Kapteyn, A., Mackenbach, J., Siegrist, J., & Weber, G. (2008). *First results from the Survey of Health, Ageing and Retirement in Europe (2004–2007): Starting the longitudinal dimension.* Germany: Mannheim Research Institute for the Economics of Aging (MEA).

Börsch-Supan, A., Brandt, M., Hunkler, C., Kneip, T., Korbmacher, J., Malter, F., … Zuber, S. (2013). Data Resource Profile: The Survey of Health, Ageing and Retirement in Europe (SHARE). *International Journal of Epidemiology,* **42**, 992–1001. doi:10.1093/ije/dyt088

Centers for Disease Control and Prevention (CDC), National Center for Injury Prevention and Control. (2013). Web-based Injury Statistics Query and Reporting System (WISQARS). Retrieved from http://www.cdc.gov/ncipc/wisqars

Cheek, S. M., Nestor, B. A., & Liu, R. T. (2015). Substance use and suicidality: Specificity of substance use by injection to suicide attempts in a nationally representative sample of adults with major depression. *Depression and Anxiety*. Advance online publication. doi:10.1002/da.22407

Conwell, Y., Van Orden, K., & Caine, E. D. (2011). Suicide in older adults. *Psychiatric Clinics of North America*, **34**, 451–468. doi:10.1016/j.psc.2011.02.002

Desseilles, M., Perroud, N., Guillaume, S., Jaussent, I., Genty, C., Malafosse, A., & Courtet, P. (2012). Is it valid to measure suicidal ideation by depression rating scales? *Journal of Affective Disorders*, **136**, 398–404. doi:10.1016/j.jad.2011.11.013

Erlangsen, A., Stenager, E., & Conwell, Y. (2015). Physical diseases as predictors of suicide in older adults: A nationwide, register-based cohort study. *Social Psychiatry and Psychiatric Epidemiology*, **50**, 1427–1439. doi:10.1007/s00127-015-1051-0

Fässberg, M. M., Östling, S., Braam, A. W., Bäckman, K., Copeland, J. R., Fichter, M., … Waern, M. (2014). Functional disability and death wishes in older Europeans: Results from the EURODEP concerted action. *Social Psychiatry and Psychiatric Epidemiology*, **49**, 1475–1482. doi:10.1007/s00127-014-0840-1

Fiske, A., & O'Riley, A. A. (in press). Toward an understanding of late life suicidal behavior: The role of lifespan developmental theory. *Journal of Aging and Mental Health*.

Fiske, A., O'Riley, A., & Widoe, R. (2008). Physical health and suicide in late life: An evaluative review. *Clinical Gerontologist*, **31**, 31–50. doi:10.1080/07317110801947151

Fuller-Thomson, E., & Shaked, Y. (2009). Factors associated with depression and suicidal ideation among individuals with arthritis or rheumatism: Findings from a representative community survey. *Arthritis & Rheumatism*, **60**, 944–950. doi:10.1002/art.24615

Goodwin, R. D., Olfson, M., Shea, S., Lantigua, R. A., Carrasquilo, O., Gameroff, M. J., & Weissman, M. M. (2003). Asthma and mental disorders in primary care. *General Hospital Psychiatry*, **25**, 479–483. doi:10.1016/S0163-8343(03)00071-9

Hampson, S. E., & Friedman, H. S. (2008). Personality and health: A lifespan perspective. In O. P. John, R. Robins, & L. Pervin (Eds.), *The handbook of personality* (3rd ed., pp. 770–794). New York, NY: Guilford Press.

Haw, C., Harwood, D., & Hawton, K. (2009). Dementia and suicidal behavior: A review of the literature. *International Psychogeriatrics/IPA*, **21**, 440–453. doi:10.1017/S1041610209009065

Joiner, T. (2005). *Why people die by suicide*. Cambridge, MA: Harvard University Press.

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**, 1179–1184. doi:10.1001/archinte.164.11.1179

Kim, Y. A., Bogner, H. R., Brown, G. K., & Gallo, J. J. (2006). Chronic medical conditions and wishes to die among older primary care patients. *International Journal of Psychiatry in Medicine*, **36**, 183–198. doi:10.2190/3QXD-UR0H-K8FH-2CU8

Kostić, V. S., Pekmezović, T., Tomić, A., Ječmenica-Lukić, M., Stojković, T., Špica, V., … Džoljić, E. (2010). Suicide and suicidal ideation in Parkinson's disease. *Journal of the Neurological Sciences*, **289**, 40–43. doi:10.1016/j.jns.2009.08.016

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**, 909–916. doi:10.1176/appi.ajp.159.6.909

Muthén, L. K. & Muthén, B. O. (1998–2010). *MPlus User's Guide* (6th ed.). Los Angeles, CA: Author.

Pompili, M., Lester, D., Innamorati, M., De Pisa, E., Amore, M., Ferrara, C., … Girardi, P. (2009). Quality of life and suicide risk in patients with diabetes mellitus. *Psychosomatics: Journal of Consultation and Liaison Psychiatry*, **50**, 16–23. doi:10.1176/appi.psy.50.1.16

Prince, M. J., Reischies, F., Beekman, A. T. F., Fuhrer, R., Jonker, C., Kivela, S.-L., … Copeland, J. R. M. (1999). Development of the EURO-D scale—A European Union initiative to compare symptoms of depression in 14 European countries. *British Journal of Psychiatry*, **174**, 330–338. doi:10.1192/bjp.174.4.330

Sanna, L., Stuart, A. L., Pasco, J. A., Kotowicz, M. A., Berk, M., Girardi, P., & Williams, L. J. (2014). Suicidal ideation and physical illness: Does the link lie with depression? *Journal of Affective Disorders*, **152–154**, 422–426. doi:10.1016/j.jad.2013.10.008

SAS Institute Inc. (2004). *Communications Access Methods for SAS/CONNECT 9.1 and SAS/SHARE 9.1*, Cary, NC: Author.

Scott, K. M., Hwang, I., Chiu, W. T., Kessler, R. C., Sampson, N. A., Angermeyer, M., … Nock, M. K. (2010). Chronic physical conditions and their association with first onset of suicidal behavior in the world mental health surveys. *Psychosomatic Medicine*, **72**, 712–719. doi:10.1097/PSY.0b013e3181e3333d

Silverman, M. M., Berman, A. L., Sanddal, N. D., O'Carroll, P. W., & Joiner, T. E. (2007). Rebuilding the tower of Babel: A revised nomenclature for the study of suicide and suicidal behaviors. Part 2: Suicide-related ideations, communications, and behaviors. *Suicide & Life-Threatening Behavior*, **37**, 264–277. doi:10.1521/suli.2007.37.3.264

Survey of Health, Ageing, and Retirement in Europe (SHARE). (2013, November 29). *SHARE Release Guide 2.6.0 Waves 1 & 2*. Retrieved from http://www.share-project.org/fileadmin/pdf_documentation/SHARE_guide_release_2-6-0.pdf

Värnik, P. (2012). Suicide in the world. *International Journal of Environmental Research and Public Health*, **9**, 760–771. doi:10.3390/ijerph9030760

Waern, M., Rubenowitz, E., Runeson, B., Skoog, I., Wilhelmson, K., & Allebeck, P. (2002). Burden of illness and suicide in elderly people: Case-control study. *British Medical Journal*, **324**, 1355–1358. doi:10.1136/bmj.324.7350.1355

Walker, J., Waters, R. A., Murray, G., Swanson, H., Hibberd, C. J., Rush, R. W., … Sharpe, M. (2008). Better off dead: Suicidal thoughts in cancer patients. *Journal of Clinical Oncology*, **26**, 4725–4730. doi:10.1200/JCO.2007.11.8844

Witte, T. K., Joiner, T. E., Brown, G. K., Beck, A. T., Beckman, A., Duberstein, P., & Conwell, Y. (2006). Factors of suicide ideation and their relation to clinical and other indicators in older adults. *Journal of Affective Disorders*, **94**, 165–172.

World Health Organization. (2014). Preventing suicide: A global imperative. Retrieved from http://www.who.int/mental_health/suicide-prevention/exe_summary_english.pdf