Impairments in Health Functioning and Sleep Quality in Older Adults with a History of Depression

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OBJECTIVES: To determine whether older adults with a history of depression show impairments in health functioning and sleep quality at a gradient between older adults with no history of depression and those with current major depression and to examine whether poor sleep quality contributes to declines in health functioning in addition to the contribution of depressive symptoms.

DESIGN: Cross-sectional.

SETTING: Three urban communities: Denver, Colorado, and Los Angeles and San Diego, California.

PARTICIPANTS: Two hundred community-dwelling adults aged 60 and older who were never mentally ill, 143 with a history of major or minor depressive disorder in remission, and 67 with a current depressive disorder.

MEASUREMENTS: Diagnosis, Structured Clinical Interview for *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*; health functioning (Medical Outcomes Study 36-item Short-Form Health Survey); depressive symptom severity (Beck Depression Inventory); and sleep quality (Pittsburgh Sleep Quality Index).

RESULTS: Older adults with a history of depression showed impairments in sleep quality and had lower levels of health functioning than controls; these impairments were at a gradient with declines in those with current depression. Poor sleep quality was independently associated with declines in health perception in older adults with and without depression.

CONCLUSION: These findings have important health implications for older people who have a lifetime history of depression, given evidence that poor health functioning is a risk factor for depression recurrence as well as mortality. Moreover, in view of the association between sleep quality and health status, testing of interventions that target sleep quality might identify strategies to improve health functioning in older adults. **J Am Geriatr Soc 54:1184–1191, 2006.**

Key words: major depression; depression history; health functioning; sleep quality; aging

Aging is associated with progressive declines in health functioning.[1,2] Even in medically stable older adults, poor vitality and bodily pain predict greater numbers of physician visits,[3] and declines in health perceptions predict hospitalizations,[4] home care,[4] and mortality.[5,6] Indeed, a low level of health perception is a strong predictor of mortality in older adults.[3]

Major depression leads to further impairments in health perceptions and physical performance in older people,[7] and such disability is comparable with the impairments found in patients with chronic medical disorders such as arthritis or diabetes mellitus.[8,9] Given evidence that poor physical functioning is reported to be a risk factor for recurrence of depression in older people,[10] it is also important to know whether older adults who have had depression but are no longer depressed show impairments in health functioning.[11] However, findings are mixed; one intervention trial reported improvements in physical functioning after remission of depression in primary care patients, whereas another trial in middle-aged adults found persistent low levels of health functioning.[12,13] One cross-sectional study has been conducted in older adults. Whereas impairments in health functioning were found in community-dwelling older adults with a history of depression, the inclusion of persons who had clinically significant depressive symptoms limited conclusions.[14]

It is hypothesized that sleep disturbances are related impairments in health functioning, even in depressed persons who have had a full clinical remission. For example, insomnia is associated with decrements in a number of health-functioning domains,[15] is highly prevalent in older adult populations,[16–18] and often persists for months to years after treatment of major depression and full remission of depressed mood and other affective symptoms. To the

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authors' knowledge, no studies have examined whether impairments in sleep quality are associated with declines in health functioning independent of depressive symptoms in older adults with and without a history of depression.

This study evaluated health functioning and sleep quality in community-dwelling older adults who had a history of depression but who were not currently depressed. For comparison, measures of health functioning and sleep quality were also obtained in two other groups: older adults who had no lifetime history of a psychiatric illness and older adults who had a current depressive disorder. Two hypotheses were examined: that older adults with a history of depression would show deficits in health functioning at a gradient between never mentally ill older adults and those with current depression and that the presence of sleep-quality disturbances would be independently associated with declines in health functioning in addition to the association with severity of depressive symptoms in the three groups. Consistent with much of the research on depression and disability assessment, the Medical Outcomes Study 36-item Short-Form Health Survey (SF-36) was used as a measure of limitations on physical activity or physical role performance, along with general health status, health perceptions, and psychosocial functioning.

METHODS

Overview

The Depression Substudy of the Veterans Affairs Cooperatives Trial #403, Shingles Prevention Study (SPS), provided the data presented in this article.[19] The SPS is a double-blind, placebo-controlled, multicenter, efficacy trial that showed that vaccination with live-attenuated Oka/Merck varicella vaccine decreases the incidence and severity of herpes zoster and its complications in adults aged 60 and older over the course of a 3-year longitudinal follow-up. Based on results from a depression screening, subjects were enrolled in the depression substudy, which involved baseline psychiatric interviews and assessment of depressive symptom severity, sleep quality, and health functioning along with subsequent follow-up visits. Data reported here are from the baseline assessment. The institutional review boards of the University of Colorado, University of California at San Diego, and University of California at Los Angeles approved all procedures.

Subject Recruitment

The depression substudy recruited subjects from three sites: University of Colorado, University of California at San Diego, and University of California at Los Angeles. Community-dwelling older adults were targeted using general media publicity, letters of invitation, advertising, and interactions with local referral groups. Spouses of veterans were encouraged to enter the trial. Consistent with the SPS eligibility criteria, all subjects were aged 60 and older and had a history of varicella (i.e., chickenpox) or long-term ($\geq$30 years) residence in the continental United States. In addition, this community-dwelling population was in good medical health; individuals with evidence of immunosuppression (e.g., neoplastic disease, corticosteroids) or underlying illness that would prevent study completion were excluded.

A total of 2,858 subjects entering the SPS underwent screening for entry into the depression substudy. Depression screening included completion of an abbreviated version of the Centers for Epidemiological Study of Depression Scale[20] and answering two questions as to whether they had a prior episode of depression or had been treated for depression. Persons who scored above the previously validated Centers for Epidemiological Study of Depression Scale score for depression or answered affirmatively for having had or received treatment for depression were interviewed (n = 212). In addition, a sample of SPS trial participants who did not meet depression screening criteria were interviewed (n = 219) as possible controls who had never been mentally ill.

Diagnostic Instrument and Assessment of Major Depression and Lifetime History

All subjects in the depression substudy underwent a psychiatric diagnostic interview with administration of the Structured Clinical Interview for the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV),[21] and alcohol and drug consumption modules of the semistructured interview developed by the multisite Collaborative Study on the Genetics of Alcoholism.[22] Trained doctoral-level psychiatric nurses completed all interviews and presented data in a diagnostic consensus meeting that included at least two psychiatric nurses, a board-certified psychologist (SJM), and a board-certified psychiatrist (MRI). Major depressive episodes were diagnosed and qualified in terms of severity and remission status according to DSM-IV criteria. Depression severity was further assessed using administration of the Beck Depression Inventory (BDI). The Pittsburgh Sleep Quality Index (PSQI) was used to assess perceived sleep quality and to screen for clinical sleep impairment, defined as a PSQI score greater than 5.[23]

The following outlines the construction of the three groups. Of the 219 persons who did not reach screening criteria for a depressive disorder or history of depression (i.e., never mentally ill controls), 13 subjects were excluded for past history of an Axis I disorder (e.g., alcohol dependence) and six for mild to moderate depressive symptoms (BDI $>$10). Thus, this control group represented a sample of older adults who had never been mentally ill and had no current depressive symptoms (n = 200).

Of the 212 persons who fulfilled screening criteria for depressive disorder or history of depression, two were excluded because of current alcohol dependence. A total of 67 persons met full diagnostic criteria for having current depression; of this group, 52 had current major depression, and 15 had current depression not otherwise specified (NOS) that also fulfilled criteria for the alternate label of minor depressive disorder. The remaining 143 subjects reported a history of depression but did not fulfill diagnostic criteria for current major depression or for any other comorbid DSM-IV disorder (including dysthymia, anxiety, or substance dependence disorders). Of these subjects, 110 met criteria for history of major depression, and 33 met criteria for history of depression NOS. (Thirty-one fulfilled criteria for history of minor depressive disorder, and 2 met criteria for history of dysthymia.) Thus, the final sample

consisted of the following groups: control (never mentally ill, n = 200), history of depression (n = 143), and current depression (n = 67).

Self-Report Measures

The Chronic Disease Score (CDS) was determined to obtain a standardized measure of medical illness based on medication use over a 6-month period.[24] Because the CDS does not include psychotropic or analgesic medications, this measure provides an estimate of global disease status independent of depressive symptoms and is less influenced by psychological distress than self-rated health status measures. Scores can range from 0 to 35; scores above 7 are associated with a five times greater hospitalization risk and 10 times greater risk of dying 1 year later.[24] Depression severity was assessed using the BDI,[25] a 21-item self-report measure of cognitive, affective, and vegetative symptoms of depression. Scores range from 0 to 63; scores less than 10 are thought to indicate no or minimal symptoms.[26] The SF-36 is a 36-item measure that provided assessment of physical disability (i.e., function and role physical scales), general health perception and symptoms (i.e., general health, vitality, and bodily pain scales), and psychosocial disability (i.e., social function, role performance as limited by emotional problems, and mental health scales).[27] A score of 100 indicates best possible function, and a score of 0 indicates worst possible function. The PSQI is a 19-item self-report measuring problematic sleep. Higher scores reflect more sleep difficulties, and the instrument shows good sensitivity and specificity for identifying those with or without sleep impairments using a total score cutoff of 5.[28]

Statistical Analysis

All data were entered into and analyzed using SPSS (SPSS Inc., Chicago, IL). Group differences in demographic and clinical characteristics were tested using analysis of variance; for noncontinuous demographic variables, the Pearson chi-square test was used. Group differences in health functioning (SF-36) were tested using analyses of covariance (ANCOVA). A Bonferroni-adjusted alpha level of 0.006 (0.05/8 comparisons) was required for differences to achieve statistical significance. Age, sex, CDS, marital status, and education level were used as covariates, because each of these measures has been associated with SF-36 scores. Follow-up analyses tested differences between groups using a Bonferroni correction. Although large differences are often found between the control group and the group with current depression, the magnitude of differences between the control group and the group with a history of depression is unclear. Therefore, to discern the size of possible significant differences, effect-size estimates were calculated using Cohen's *d*; this statistic reflects the standardized difference between the means of two groups. Although effect sizes fall on a continuum, values of 0.2, 0.5, and 0.8 can be considered small, medium, and large.[29]

Regression analyses were used to test the hypothesis that the presence of sleep-quality disturbances would be independently associated with declines of health functioning after controlling for severity of depressive symptoms in the total sample, as well as in each of the three groups. In these regression models, demographic covariates, including age, sex, CDS, marital status, and education level, that were related to health functioning were entered in the first step, followed by severity of depressive symptoms as measured according to BDI scores in the second step and PSQI scores in the third step. BDI scores were calculated after removal of a single sleep-related item. Regressions were performed in the total sample, with follow-up analyses in each group.

RESULTS

Demographic and Clinical Characteristics

Tables 1 and 2 summarize the demographic and clinical characteristics for the control group, the group with a history of depression, and the group with current depression. Subjects ranged in age from 60 to 90, with the mean for the entire sample being 69; the group with a history of depression was significantly younger (mean ± standard deviation 67.2 ± 6.4) than the control group (69.8 ± 6.2), but the group with current depression was between the two groups on age and thus was not different from either one. Severity of medical comorbidity as indexed using the CDS did not differ between the groups. The control group was

Table 1. Clinical Characteristics of Study Subjects

Characteristic	Control (n = 200)	History of Depression (n = 143)	Current Depression (n = 67)	*F*	*P*-value
	Mean ± Standard Deviation				
Age (range 60–90)	69.8 ± 6.2	67.2 ± 6.4*	68.1 ± 5.6	$F(2, 407) = 5.3$	<.01
Chronic Disease Score (range 0–9)	1.9 ± 2.2	2.3 ± 2.2	1.8 ± 2.2	$F(2, 407) = 1.6$	.20
Beck Depression Inventory (range 0–63)	2.4 ± 2.3	4.8 ± 4.4*†	15.4 ± 8.0*	$F(2, 403) = 217.4$	<.001
Number of previous episodes		1.0 ± 0.8†	1.6 ± 1.4	$F(1, 202) = 13.9$	<.001
Pittsburgh Sleep Quality Index (range 0–21)	3.5 ± 2.7†	5.7 ± 3.6*†	8.4 ± 3.9*	$F(2, 400) = 62.0$	<.001

Note: Post hoc group differences tested using Bonferroni correction for multiple comparisons.
* Indicates significantly different from control group.
† Indicates significantly different from current depression group.

Table 2. Demographic Characteristics of Study Subjects

Characteristic	Control (n = 200)	History of Depression (n = 143)	Current Depression (n = 67)	Chi-Square	*P*-value
	%				
Female	50.5	60.1	61.2	4.2	.13
Married	67.5	55.2	55.2	6.5	.04
Education >13 years	83.0	90.2	73.0	10.1	.008
Ethnicity Euro-American	96.5	97.9	94.0	2.1	.35

Note: Percentages reflect percentage within each group.

more likely to be married than the other groups, and the group with current depression had fewer years of education than the other groups. Sex and ethnicity distribution was similar.

Severity of depressive symptoms was higher in the group with current depression than in the other groups (Table 1). In addition, the group with a history of depression had higher levels of depressive symptoms than the control group, although both of these groups had levels of depressive symptoms within the normal, nonclinical range (95% confidence interval = 2.1–4.1). The group with current depression had a moderate level of depressive symptoms, consistent with identification of depressed persons from a community-dwelling older adult population. The group with current depression had more lifetime episodes of depression than the group with a history of depression.

Sleep quality, as indexed using the PSQI, was significantly different between the groups in a stepwise fashion, with depressed subjects reporting the poorest sleep quality and those with a history of depression reporting worse sleep than the control group. Scores greater than 5 on the PSQI are thought to indicate clinical sleep impairments,[28] and

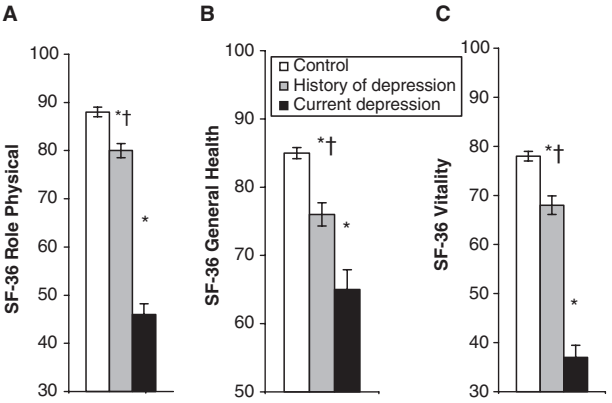

Figure 1. Medical Outcomes Study 36-Item Short-Form Health Survey scores for (A) role physical, (B) general health perceptions, and (C) vitality for each group. *Significantly different from control group. †Significantly different from group with current depression. Higher scores indicate better functioning (range 0–100).

such elevated scores were found in 77% of subjects with current depression, 45% of subjects with a history of depression, and 15% of the controls.

Health Functioning

ANCOVA was used to test for group differences in health functioning. The covariates were age, sex, marital status, education, and severity of medical comorbidity (CDS). Age was significantly related to physical, role-physical, and role-emotional functioning, with older age being related to poorer scores (all $P < .05$). Sex was a significant covariate for physical functioning, bodily pain, and vitality, with women reporting greater impairment than men (all $P < .05$). CDS was a significant covariate for physical functioning, role-physical, bodily pain, general health, and vitality (all $P < .05$), with higher medical comorbidity associated with lower SF-36 scores. Other health functioning measures

Table 3. Physical Disability, Health Perception, and Psychosocial Disability in the Control, History of Depression, and Current Depression Groups

SF-36 Items	Control (n = 200)	History of Depression (n = 143)	Current Depression (n = 67)	*F**
	Mean ± Standard Deviation			
Physical functioning	85 ± 18‡	80 ± 17‡	66 ± 24†	$F(2, 398) = 28.7$
Role physical	88 ± 22‡	80 ± 29†‡	46 ± 38†	$F(2, 397) = 58.6$
Bodily pain	79 ± 19‡	73 ± 18‡	58 ± 24†	$F(2, 398) = 25.5$
General health	85 ± 11‡	76 ± 16†‡	68 ± 20†	$F(2, 398) = 31.9$
Vitality	78 ± 14‡	65 ± 18†‡	38 ± 18†	$F(2, 398) = 145.6$
Social functioning	97 ± 10‡	91 ± 14†‡	66 ± 24†	$F(2, 397) = 103.1$
Role emotional	95 ± 17‡	86 ± 26†‡	38 ± 38†	$F(2, 397) = 130.8$
Mental health	90 ± 9‡	80 ± 14†‡	56 ± 18†	$F(2, 398) = 165.8$

Note: All post hoc tests were done using Bonferroni correction for multiple comparisons.

* All *F* values $P < .001$. Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36) scores range from 0–100, with lower scores reflecting greater impairment. All *F* values are from analyses of covariance, using age, sex, chronic disease score, marital status, and education as covariates.

† Indicates significantly different from control group.

‡ Indicates significantly different from current depression group.

were not related to age, sex, or CDS scores. Neither marital status nor education was significantly associated with any of the SF-36 scales.

For the domains of physical disability, measures of physical functioning, role-physical, and bodily pain differed between the three groups (Table 3). Unlike with controls, deficits in role-physical were found in the groups with a history of depression and current depression (Figure 1A), with the group with current depression showing greater deficits in role-physical than the group with a history of depression. Measures of physical functioning and bodily pain in the group with current depression were lower than in either of the other two groups.

For domains of health perception, there were significant group differences in measures of general health and vitality. The groups with a history of depression and current depression had more impairments in general health (Figure 1B) and vitality (Figure 1C) than controls. In addition, the group with current depression had greater declines in general health and vitality than the group with a history of depression.

For the domains of psychosocial disability, measures of social functioning, role-emotional limitations, and mental health each had significant group differences. Both groups with depression had worse levels of functioning than controls, with the group with current depression being the worst.

In sum, the group with a history of depression differed from the controls on six of the eight SF-36 scales, including role-physical, general health perceptions, vitality, social functioning, role-emotional, and mental health. To ensure that these differences were not an artifact of incomplete remission in the group with a history of depression, the data were reanalyzed after exclusion of 19 subjects who reported a remission duration of less than 1 year (n = 2) or presence of mild depressive symptoms (BDI >10; n = 17). Similar results were found, with the group with a history of depression differing from the controls on six of the eight SF-36 scales, including physical functioning, general health, vitality, social functioning, role-emotional, and mental health (data not shown).

Table 4. Multivariate Analyses of Correlates of Health Functioning in 400 Older Adults with and without a History of Depression

Medical Outcomes Study 36-Item Short-Form Health Survey Scores and Correlates	R^2	Incremental R^2	F*	P-value	Beta†
Physical functioning					
Age, sex, CDS, education, and marital status	.12		11.2	<.001	
BDI	.30	.18	104.0	<.001	−0.34
Sleep quality (PSQI)	.33	.03	16.1	<.001	−0.20
Role physical					
Age, sex, CDS, education, and marital status	.03		2.2	.05	
BDI	.35	.32	194.9	<.001	−0.49
Sleep quality (PSQI)	.37	.02	13.4	<.001	−0.17
Bodily pain					
Age, sex, CDS, education, and marital status	.03		2.4	.04	
BDI	.21	.18	87.6	<.001	−0.28
Sleep quality (PSQI)	.27	.06	30.7	<.001	−0.28
General health					
Age, sex, CDS, education, and marital status	.07		5.9	<.001	
BDI	.32	.25	149.0	<.001	−0.40
Sleep quality (PSQI)	.36	.04	22.7	<.001	−0.23
Vitality					
Age, sex, CDS, education, and marital status	.05		3.9	.002	
BDI	.55	.50	436.4	<.001	−0.59
Sleep quality (PSQI)	.60	.05	48.0	<.001	−26
Social functioning					
Age, sex, CDS, education, and marital status	.02		1.9	.10	
BDI	.50	.48	380.8	<.001	−0.67
Sleep quality (PSQI)	.51	.01	3.7	.06	−0.08
Role emotional					
Age, sex, CDS, education, and marital status	.03		2.0	.08	
BDI	.50	.47	371.0	<.001	−0.64
Sleep quality (PSQI)	.51	.01	8.2	.004	−0.12
Mental health					
Age, sex, CDS, education, and marital status	.05		3.7	.003	
BDI	.60	.55	538.8	<.001	−0.65
Sleep quality (PSQI)	.63	.03	34.6	<.001	−0.21

* F-test results indicate whether incremental variance was significantly different from 0.
† Beta coefficient generated from fully inclusive model.
R^2 = coefficient of determination; CDS = chronic disease score; BDI = Beck Depression Inventory; PSQI = Pittsburgh Sleep Quality Index.

The magnitude of differences between the control group and the group with a history of depression was calculated using Cohen's *d* effect-size estimate; group-difference effect sizes ranged from large to small, with the largest effects found for vitality and mental health ($d = 0.80$ and 0.86, respectively). Smaller effect sizes were found for role-physical, role-emotional, and social functioning ($d = 0.33$, 0.39, and 0.49, respectively). Within the group with a history of depression, none of these SF-36 scores correlated with time since last depression or number of previous episodes (Spearman rhos between -0.06 and -0.18).

Role of Sleep Quality

To examine whether sleep quality was related to lower levels of health functioning in the total sample, multiple regression analyses were performed, controlling for demographic covariates and depressive symptoms. After stepwise entry of the demographic covariates (age, sex, CDS, marital status, and education level) and BDI scores, with the single sleep-related item removed, PSQI scores were entered on the third step. PSQI scores were significantly and independently associated with seven of eight SF-36 scales in the total sample, such that poorer sleep quality was associated with significantly lower levels of physical functioning, role-physical, bodily pain, general health, vitality, role-emotional, and mental health (all $P < .05$), with a trend for social functioning ($P = .06$) (Table 4). Moreover, sleep quality, together with demographic factors and severity of depressive symptoms, predicted 27% to 63% of the total variance in these various domains of health functioning.

Follow-up analyses within each group showed that PSQI was similarly related to bodily pain ($\beta = -0.23$ to -0.27, $P < .01$), general health ($\beta = -0.16$ to -0.29, $P < .05$), and vitality ($\beta = -0.21$ to -0.29, $P < .01$) in the separate groups of controls, older adults with a history of depression, and older adults with current depression. In contrast, PSQI was related to physical functioning and to role-physical only in the control group ($\beta = -0.20$, $P < .001$ and $\beta = -0.22$, $P < .01$, respectively) but not in the depression groups (all $\beta < 0.16$), whereas PSQI was related to mental health in the group with current depression ($\beta = -0.41$, $P < .01$) but not in the control group or the group with a history of depression (all $\beta < 0.12$). PSQI was not related to role-emotion or social functioning within any of the groups (all $\beta < 0.14$)

DISCUSSION

Community-dwelling older adults with a history of a depressive episode showed evidence of poorer vitality, more-pessimistic health perceptions, psychosocial disability, and mildly greater physical disability than those with no history of a major psychiatric disorder. These impairments are notable given the protracted duration since last depression episode (on average, 16 years), absence of clinically significant depressive symptoms, and the sampling of community-dwelling, healthy older adults at the high end of the functional spectrum. Consistent with prior studies,[9,30–33] marked impairments were also found in each domain of physical and psychosocial health functioning in older people with current depression. Hence, this study provides novel evidence that impairments in health functioning are present in older adults with a lifetime history of major depression and that these impairments are at a gradient, with marked declines found in older adults with current depression. Given evidence that poor health functioning is associated with depression recurrence,[10] as well as mortality, in older people,[5,6] these findings have important implications for understanding risk of health declines in older people with a history of depression.

The mechanisms that contribute to physical disability, fatigue, and poorer perceived health in older adults with and without depression are not known but are likely multifactorial, encompassing behavioral and biological domains. Insomnia and sleep quality may be one such domain. In the current study, those with a history of depression showed declines in health functioning despite low levels of depressive symptoms. Consistent with the hypothesis, the group with a history of depression reported significantly poorer sleep quality than the control group, with more than 45% of the group with a history of depression showing clinical sleep impairments as indexed using the PSQI. Furthermore, across the total sample, as well as within each group, poor sleep quality as a continuous measure was associated with greater bodily pain, poorer health perception, and less vitality, even after controlling for severity of depressive symptoms and demographic factors. Moreover, in older adult controls without a history of depression, poor sleep quality correlated with measures of physical disability. Together, these data support conclusions that sleep disturbance is an independent risk factor for declines in physical functioning and mortality risk;[33,34] epidemiological studies indicate that insomnia is associated with worse health functioning.[15] Hence, it is possible that successful sleep contributes to resilience and greater health preservation in older adults; alternatively, older adults with a lifetime history of depression and poor sleep quality may show less resilience with aging.[34,35] Indeed, insomnia that persists after depression treatment might indicate a heightened vulnerability to depressive relapse or recurrence.[36]

There may be other pathways that are associated with impaired health functioning in those with a history of depression. The functioning of biological systems, including the hypothalamic-pituitary axis, sympathetic nervous system, and immune system, are dysregulated during a depressive episode,[37–39] and these abnormalities might persist even after depressive symptoms remit. Indeed, patients fully recovered from depression show persistent abnormal elevations in waking salivary cortisol.[39] Thus, chronic physiological dysregulation may contribute to heightened allostatic load, which is associated with declines in physical and cognitive functioning in older people.[40]

This study had several limitations. Because it was a substudy of the SPS, the groups were medically healthy. Differences between groups in health functioning did not reflect differences in medical comorbidity as indexed according to prescription medication use or in other confounding factors such as age, sex, marital status, or educational level. Second, given that the sample population was primarily white, it is not known whether these findings can be generalized to ethnic minorities. Third, screening selection of the depression groups relied upon a threshold for current depressive symptom severity or

reports of a prior episode of depression or depression treatment. It is likely that, because of screening bias in selecting participants who had episodes of depression or depression treatment, only a small number of participants in the group with a history of depression had dysthymia. For people with current depression, dysthymia rarely begins in late life. Fourth, the depression groups included older adults with major depression or depression NOS (minor depression). There is considerable overlap across subtypes of depression, with further evidence that the threshold of reporting symptoms of depression is higher in older adults than in those in middle age and that minor depression as variously defined is associated with impairments in perceived health similar to major depression.[41,42] Finally, the impairments in health functioning seen in the group with a history of depression were not likely due to a negative reporting bias in which subjects report negatively across a host of scales. If this were so, one would expect the bias to be visible across other domains such as bodily pain and physical functioning, yet the history and control groups did not differ on these variables.

Treatment efforts that target sleep quality may be found to be efficacious in improving health functioning in older adults with a history of depression. It is known, for example, that interventions for insomnia such as cognitive-behavioral therapy yield robust improvements of sleep outcomes and daytime functioning in older adults.[43] Similarly, novel interventions such as tai chi, which have been found to improve sleep quality in older adults,[44] also improve their health functioning.[45]

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