

Article

# Depressive Symptoms Increase the Risk of Mortality for White but Not Black Older Adults

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**Abstract:** *Introduction.* Long-term studies have shown that depressive symptoms predict the risk of mortality. However, it is unknown if this effect is present in shorter time intervals. In addition, recent research suggests that the salience of the negative affect on the risk of mortality is not similar across racial groups. The current study uses data from a national study of Black and White older adults to examine racial differences in the effect of baseline depressive symptoms on mortality risk over three years in the United States. *Methods.* This study used a longitudinal prospective design and followed 1493 older adults who were either White ( $n = 759$ ) or Black ( $n = 734$ ) for three years from 2001 to 2004. Depressive symptoms measured at baseline was the independent variable. Demographic factors, socio-economic characteristics (education, income, marital status), health behaviors (smoking and drinking), and health (self-rated health) measured at baseline in 2001 were covariates. The dependent variable was all-cause mortality between 2001 and 2004. Race was the moderator. Logistic regressions were used for data analysis. *Results.* In the pooled sample, high depressive symptoms at baseline were not associated with the three-year risk of mortality. In the pooled sample, we found a significant interaction between race and depressive symptoms on mortality, suggesting a stronger effect for Whites in comparison to Blacks. In race stratified models, depressive symptoms at baseline were predictive of mortality risk for Whites, but not Blacks. *Conclusions.* In the United States, Black-White differences exist in the effects of depressive symptoms on mortality risk in older adults. White older adults may be more vulnerable to the effects of depressive symptoms on mortality risk.

**Keywords:** race; ethnic groups; African Americans; mortality; depression; depressive symptoms

## 1. Introduction

Psychosocial resources (e.g., education, income, employment, and marital status) and psychological assets (e.g., affect and coping) are essential for maintaining health and well-being [1,2]. Individuals with high levels of psychosocial risk factors are at a higher risk of poor health [3,4], physical functioning [5], chronic disease [6], and mortality [7]. Negative affect and depressive symptoms also increase the risk of mortality [8,9].

In a number of studies, race, ethnicity, and class have been found to alter the effects of psychosocial resources and assets on chronic disease [10] and health [11]. Race, ethnicity, and class also mitigate the effects of depression on physical health [12–19]. Racial and ethnic groups differ in separate [20] and combined [21] effects of depression and anxiety on obesity, [20–22] cardiovascular diseases (CVDs) [11,22–24], and well-being [12]. All this literature suggests that race and ethnicity operate as moderators for the effects of psychosocial factors on physical health outcomes [15–19,24–27].

Although Cooper et al. [28], Lewis et al. [11,23], Assari et al. [22,24,29], and Capistrant et al. [30] have all documented Black-White differences in the effect of depression on coronary artery disease

(CAD) and CAD risk factors, the results of these studies are inconsistent. Cooper et al. showed that among individuals with depression, comorbid Posttraumatic Stress Disorder (PTSD) was linked to a lower and higher risk of CAD for Whites and Blacks, respectively [28]. In a longitudinal study by Lewis et al., high depressive symptoms predicted CVD and stroke mortality for Blacks but not Whites [11]. In another prospective study by Capistrant et al., race did not modify the effect of depression on CVD mortality [30].

Racial differences are not specific to the effects of depressive symptoms [8,9,31–33] as similar patterns are shown for a wide range of other psychosocial factors such as mastery [33,34], sleep [35], and perceived health [36]. The effects of education [37], income [38], employment [39], neighborhood quality [40], and social network [41] are shown to be stronger for Whites than Blacks. It is, however, not only race, but also SES, that buffers the effects of these resources and assets on mortality [7]. As race and social class have a strong overlap [42], it is still unknown whether it is race or SES that moderates the effects of these risk and protective factors.

To replicate and extend the results of the previous studies, we conducted this study to compare Black and White older adults in the United States (USA) for the effects of depressive symptoms on the short-term risk of mortality over a three year period.

## 2. Methods

### 2.1. Design and Setting

Religion, Aging, and Health Survey, 2001–2004, was a longitudinal panel study of older adults in the United States with three years of follow-up. We used data from Wave 1 and Wave 2 of the panel study [43].

### 2.2. Ethics

The Religion, Aging, and Health Survey protocol was approved by the University of Michigan Institutional Review Board (IRB). All participants provided informed consent.

### 2.3. Participants

The current study only included Black or White older adults. The sample was limited to non-institutionalized, English-speaking individuals, 65 years old or older at the time of enrollment. The study sampling was restricted to the coterminous (not Contiguous) United States (i.e., not including Alaska and Hawaii). The study sample was limited to Christians or those who were never associated with any faith. The study oversampled Blacks, so almost half of the sample is Black [43].

### 2.4. Sampling Frame

The study used random sampling to recruit a national sample. The sampling frame consisted of all eligible individuals in the Medicare Beneficiary list that were maintained by the Centers for Medicare and Medicaid Services (CMS) at the time of survey in 2001 [44]. The study used a five-step sampling process to draw individuals from the CMS file.

### 2.5. Data Collection

Data were collected by Louis Harris and Associates (now Harris Interactive, New York, NY, USA). Wave 1 interviews were performed between March and August of 2001 [43].

### 2.6. Measures

Race, demographic factors (age and gender), SES (education, income, and marital status), depressive symptoms, health risk behaviors (smoking and drinking), and health (self-rated health) were measured at baseline in 2001.

*Sociodemographic Factors.* Demographic factors were age (continuous measure) and gender (1 female 0 male). Socioeconomic characteristics included educational level (high school diploma 1 lower education 0), marital status (married 1 versus others 0), and income of the respondent (10 level categorical variable). Higher scores were indicative of higher SES.

*Health Behaviors.* Data were collected on self-reported history of smoking and drinking. We used dichotomous variables for smoking (current smoker = 1, never or ex-smoker = 0) and drinking (1 = current drinker and 0 = non-drinker). Single-item measures were previously used to measure smoking and drinking [45].

*Self-rated health (poor).* Individuals were asked a single question: “How would you rate your overall health at the present time?” Response items included: (1) Excellent, (2) Good, (3) Fair, and (4) Poor. We dichotomized the responses to excellent to fair (0) or poor (1). This single-item measure has shown high reliability and validity for the prediction of all-cause mortality of adults.

*Depressive Symptoms.* An eight-item version of the Center for Epidemiological Studies-Depression scale (CES-D) [46] was used to measure depressive symptoms. Respondents were asked about their negative emotions such as (1) blues, (2) felt depressed, (3) crying spells, (4) feeling sad, (5) not feel like eating (poor appetite), (6) feeling that everything is an effort, (7) restless sleep, and (8) could not get going. These items measure the negative affect and somatic symptoms. The eight-item CES-D measure has shown acceptable reliability and validity [47] as compared to the original 20-item CES-D measure [48–50]. Response items ranged from “rarely or none” (score 1) to “most or all of the time” (score 4). A mean score was calculated with a potential range from 1 to 4. This measure was operationalized as a continuous measure, with a higher score indicating more depressive symptoms (Cronbach Alpha = 0.87 for all, 0.85 for Whites, 0.89 for Blacks).

*Mortality.* Mortality data were obtained through various sources including the national death index, the death certificate, and the informants. Mortality was operationalized as a dichotomous variable (1 deceased, 0 alive). Mortality during the three year follow-up period was considered regardless of its time and cause. From all 1493 participants, 208 individuals were deceased during the follow up period.

## 2.7. Statistical Analysis

We used SPSS 22.0 for data analysis. Mean (SD) and frequency tables were used to describe the sample overall, and by race. We used logistic regressions in the pooled sample, and specific to race, for our multivariable models. In all models, depressive symptoms were the independent variable. All-cause mortality over the three year follow up period was the dependent variable. Demographic factors, socio-economic characteristics, health risk behaviors, and health at baseline were the covariates. Race was the focal moderator. We reported odds ratios (OR), associated 95% confidence intervals (CIs), and *p* values. *p* values less than 0.05 were considered as statistically significant.

## 3. Results

### 3.1. Sample

The study followed 1493 individuals for three years. All participants were older adults (age 65 or older). This sample was either Black ( $n = 734$ ) or White ( $n = 759$ ). From the 1493 participants, 208 individuals were deceased during follow up. From all the individuals who were deceased over the follow up period, 112 (54%) were Black and 96 (46%) were White.

### 3.2. Descriptive Statistics

Table 1 summarizes the descriptive statistics at baseline for the overall sample, as well as based on race. While age was similar between Black and White individuals, Blacks and Whites differed in gender, as the Black sample had a higher composition of females than Whites. Black participants also had a lower education, lower income, and were less frequently married. Blacks were smokers

more frequently than Whites. However, they were less likely to be a drinkers, compared to Whites. Compared to Whites, Blacks had poorer self-rated health. Depressive symptoms were also higher among Black than White participants.

**Table 1.** Descriptive statistics in the pooled sample and by race.

Characteristics	All (n = 1439)		Whites (n = 1439)		Blacks (n = 734)	
	Mean	SD	Mean	SD	Mean	SD
Age	75.14	6.67	75.37	6.82	74.91	6.49
Income *	4.59	2.49	5.63	2.49	3.49	1.96
Depressive Symptoms *	1.56	0.62	1.54	0.59	1.59	.65
	n	%	n	%	n	%
Gender *						
Male	573	38.20	314	41.37	256	34.88
Female	927	61.80	445	58.63	478	65.12
Education *						
Low	609	40.98	200	26.60	407	55.98
High	877	59.02	552	73.40	320	44.02
Married *						
No	778	52.28	306	40.53	467	64.33
Yes	710	47.72	449	59.47	259	35.67
Smoking *						
No	1342	89.59	698	92.08	638	87.04
Yes	156	10.41	60	7.92	95	12.96
Drinking *						
No	1030	68.76	451	59.50	574	78.31
Yes	468	31.24	307	40.50	159	21.69
SRH Poor *						
No	1322	88.37	694	91.80	622	84.86
Yes	174	11.63	62	8.20	111	15.14

Source: Religion, Aging, and Health Survey, 2001–2004. \*  $p < 0.05$ .

### 3.3. Models in the Pooled Sample

Table 2 shows the results of two logistic regressions in the pooled sample. While depressive symptoms were not a predictor of mortality in the pooled sample (*Model 1*), we found a significant interaction between race and depressive symptoms on mortality, suggesting a larger effect of depressive symptoms on mortality for Whites, compared to Blacks (*Model 2*).

**Table 2.** Association between baseline depressive symptoms (2001) and all-cause mortality (2001–2004) using logistic regression in the pooled sample ( $n = 1439$ ).

Characteristics	All (n = 1439) <i>Model 2</i>		All (n = 1439) <i>Model 1</i>	
	OR	95% CI	OR	95% CI
Race (Black)	0.96	0.63–1.47	2.37	0.83–6.73
Age	1.07 ***	1.05–1.10	1.07 ***	1.05–1.10
Gender (Female)	0.61 *	0.40–0.94	0.62 *	0.40–0.96
Education	1.46 #	0.94–2.27	1.47 #	0.95–2.28
Marital Status (Married)	0.83	0.52–1.31	0.84	0.53–1.32
Income	0.92	0.83–1.03	0.93	0.83–1.03
Smoking	0.80	0.43–1.49	0.83	0.45–1.56
Drinking	0.81	0.51–1.29	0.84	0.53–1.34
Self-Rated Health (SRH)	3.96 ***	2.40–6.52	4.12 ***	2.50–6.80
Depressive Symptoms	1.18	0.87–1.58	1.58 *	1.03–2.42
Depressive Symptoms × race (Black)	-	-	0.59 *	0.34–1.00
Intercept	0.00 ***		0.00 ***	

Source: Religion, Aging, and Health Survey, 2001–2004. #  $p < 0.1$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

### 3.4. Models by Race

Table 3 summarizes the results of two race-specific models to estimate the association between depressive symptoms and the subsequent risk of mortality among Blacks and Whites. *Model 3* showed that, in Whites, depressive symptoms at baseline were associated with an increased risk of mortality. *Model 4*, however, showed that this association could not be found for Blacks.

**Table 3.** Association between baseline depressive symptoms (2001) and all-cause mortality (2001–2004) using logistic regression among Whites ( $n = 759$ ) and Blacks ( $n = 734$ ).

Characteristics	Whites ( $n = 759$ ) <i>Model 3</i>		Blacks ( $n = 734$ ) <i>Model 4</i>	
	OR	95% CI	OR	95% CI
Age	1.08 **	1.04–1.12	1.08 **	1.03–1.12
Gender (Female)	0.70	0.38–1.30	0.56 #	0.30–1.03
Education	1.11	0.58–2.10	1.89 *	1.04–3.41
Marital Status (Married)	0.91	0.48–1.72	0.79	0.41–1.52
Income	0.93	0.81–1.07	0.95	0.80–1.12
Smoking	1.60	0.67–3.86	0.49	0.19–1.25
Drinking	0.95	0.51–1.77	0.73	0.35–1.51
Self-Rated Health (SRH)	2.54 *	1.17–5.53	5.98 **	3.05–11.72
Depressive Symptoms	1.74 *	1.12–2.68	0.87	0.57–1.34
Intercept	0.00 **		0.00 **	

Source: Religion, Aging, and Health Survey, 2001–2004. #  $p < 0.1$ , \*  $p < 0.05$ , \*\*  $p < 0.001$ .

## 4. Discussion

The current study had two findings. Based on the first finding, baseline depressive symptoms did not predict the three-year mortality risk for older adults in the overall sample. Based on our second finding, however, race altered this association. High depressive symptoms at baseline increased the short-term risk of mortality for White but not Black older adults. The second finding replicates some recent findings on other cohorts, age groups, and follow up durations [8,9,51].

In a 25-year follow up study of Black and White adults, [8] high depressive symptoms at baseline were predictive of mortality risk for Whites but not Blacks [8]. The same pattern is shown for the effects of depressive symptoms and anger on mortality due to heart disease [9] and renal disease [51]. This is not because our tools do not correctly measure depressive symptoms in Blacks [52,53]. It is possible because Blacks who are depressed maintain high levels of positive emotions that can potentially undo the harmful physiological effects of negative affect [54,55].

Depressive symptoms [56] and neuroticism [57] predict long-term risk of MDD for Whites, but not Blacks. Black-White differences in the predictive role of negative affect on future risk of MDD suggests that a single measurement of negative affect is not sufficient to evaluate the future risk of MDD for Black individuals. Depressive symptoms and neuroticism, however, reflect the future risk of depression for Whites very well [56,57].

Racial and ethnic differential effects are not limited to the effects of depression. In line with findings on negative affect [8,9,31–33], health effects of mastery [33,34], sleep [35], and perceived health [36] are all larger for Whites, compared to Blacks. The same pattern also holds for the health effects of education [37], income [38], employment [39], neighborhood quality [40], and social network [41], which are all larger for Whites than Blacks. These findings collectively suggest that the health effects of psychosocial factors are not universal across all racial groups, and may be race-specific.

The above differential effects align with the Minorities' Diminished Return Theory [58,59], defined as smaller health effects of economic resources and psychological assets for the minority compared to the majority population. Given that existing racism adds societal barriers to the lives of minority individuals, the very same resources and assets (and lack thereof) show smaller effects on the lives of Blacks than Whites. Blacks experience a decline in health regardless of their baseline mental

health [60], Blacks develop MDD regardless of their previous depressive symptoms [56,57], and Blacks develop poor health outcomes regardless of their economic status [38,61–63]. These should be seen as a systemic inequality in health gain from resources and assets [58,59]. Unless these differential gains are addressed, the existing racial gap between the health of Blacks and Whites may widen.

### Limitations

Our study had a few limitations. First, the database was old, dating from 2001–2004. However, the results are in line with other studies that have used more recent data [8,9,51]. Demographic and socio-political changes are extremely important, and impact findings related to race and minority status. Second, the validity of depressive symptoms and negative affect may depend upon race. In addition, the current study failed to control for some important confounders such as baseline medical conditions, stress, and access to and use of health care. Finally, the study only included Blacks and Whites. Future research should include other racial groups. A major strength of this study was the enrollment of a national sample.

### 5. Conclusions

In summary, depressive symptoms increase the risk of mortality over a three-year period in White but not Black older adults. This finding is in line with other psychosocial constructs showing health effects that are not universal but specific to race. This finding also has implications for healthcare and public health.

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**Conflicts of Interest:** The author declares no conflict of interest.

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