Vicarious Racism Stress, Racial Discrimination, and Disease Activity: The Black Women's Experiences Living with Lupus (BeWELL) Study

by

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Abstract

Systemic lupus erythematosus (SLE) is characterized by Black-White disparities in severity, which in part are associated with group differences in exposure to psychosocial stress. Among salient sources of stress are those tied to racial minority status, such as direct interpersonal experiences of racial discrimination, as well as vicarious racism (hearing about or observing others' experiences of racism). Previous research has focused primarily on interpersonal discrimination; yet facets of racism going beyond the immediate target remain understudied. We examined associations between vicarious (indirect) racism, direct experiences of everyday racial discrimination, and disease activity among 432 African American women with SLE recruited to the Black Women's Experiences Living with Lupus (BeWELL) Study (2015-2017). Multivariable analyses indicate vicarious racism stress (b=1.83, 95% CI:0.70-2.95) was positively associated with SLE activity, even after adjusting for everyday discrimination (b=1.12, 95% CI:0.41-1.84). Our findings suggest that similar to more commonly studied direct experiences of racial discrimination, future research may also consider "secondhand" exposure to racism as a cause of heightened disease activity and subsequent health risk in the context of SLE.

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Introduction

Systemic lupus erythematosus (SLE) is a chronic, inflammatory, autoimmune disease characterized by a vast array of clinical manifestations which are often unpredictable in timing and severity.[1] SLE presents a range of symptoms, from mild to severe and potentially debilitating outcomes, and include skin rashes, photosensitivity, arthritis, neurologic problems, and hematologic disorders across multiple organs of the body.[2,3] SLE is characterized by differences in prevalence along gender and racial lines, such that women are 10-15 times more likely to have the disease than men[4,5]; African American women are disproportionately burdened by SLE with incidence rates 3-4 times greater than those for White women. Moreover, there are racial disparities in SLE progression, with African American women having earlier onset of disease and greater organ damage and comorbid conditions as a result of disease activity and disease related tissue damage compared to White women.[6–11] African Americans with SLE also have earlier and higher mortality rates compared to their White counterparts.[12] Despite these documented disparities in the prevalence, incidence, and disease progression experienced by African American women with SLE, there remain major gaps in the identification of risk factors for worse SLE outcomes in this population.[13,14]

One particular source of psychosocial stress that may exacerbate the course of SLE is racial discrimination, a qualitatively unique form of psychosocial stress that is pervasive and may increase the risk of poor health through stress-mediated pathways involved in physiologic "weathering".[15–17] However, only two studies to date have linked racial discrimination to worse disease outcomes among African American women specifically in the context of SLE.[18,19] Research conducted on community samples of African Americans have found evidence for

associations with a range of negative health outcomes, most consistently with poor mental health and maladaptive health behaviors, albeit to a lesser extent with physical health outcomes and biomarkers of physiologic dysregulation.[17,20] For example, studies have found associations between racial discrimination and numerous clinical outcomes, including all-cause mortality,[21,22] hypertension and cardiovascular disease,[23,24] incident breast cancer,[25] and incident asthma.[26] Racial discrimination has also been linked with numerous biological precursors of chronic disease, such as systemic inflammation,[27,28] carotid intima media thickness,[29] coronary artery calcification,[30] blood pressure,[31,32] obesity,[33,34] and cortisol output.[35–37] Moreover, recent studies indicate a relationship between racial discrimination and premature aging at the biological and cellular level, including measures of allostatic load,[38] DNA methylation,[39] telomere length,[40–44] and oxidative stress.[45]

The vast majority of research studies on the health consequences of racism have focused on direct interpersonal discrimination.[46–48] Investigations of other facets of racism that go beyond direct victimization are in their infancy. For example, emerging lines of research suggest that vicarious racism, as an indirect form of exposure to racism, is pervasive and may contribute to health inequalities.[49,50] Vicarious racism is described as the secondhand exposure to racism, including racial discrimination directed at another individual. It is pervasive and can include witnessing others experiences of maltreatment based on race, hearing about racist incidents in the news, as well as the experiences of friends and family.[49,50] The concept of "linked lives", which refers to the interdependence among persons and social embeddedness of individual lives, suggests that events which affect one person may also affect other persons in their networks.[51,52] Along these lines, secondhand exposure to the racist experiences of others are shared among members of a social group and have potential to engage the stress response.[53–55] Accordingly,

public manifestations of racism as well as the negative experiences of others have potential to result in adverse physiological health implications beyond the immediate target.[50,56]

There is a paucity of research on the health effects of vicarious racism. However, previous studies have found evidence for negative health consequences associated with indirect racism exposure. For example, exposure to macro-level, race-related stress has been associated with poor mental health,[57–60] adverse birth outcomes,[61,62] and pronounced cortisol reactivity.[56] Experimental studies have shown increased levels of cortisol and heightened blood pressure in response to race-related stress.[63–66] A recent review found that children's vicarious exposure to parental experiences of racism is associated with adverse child mental and socioemotional health.[50] Research also suggests that African American women may experience greater exposure to life stressors, including racial discrimination, in part due to motherhood and the intersection of race and gender.[67–69] For example, studies on African American mothers have identified that indirect exposure to racism through their children's experiences with discrimination is a major source of stress.[70–73] Other studies have found exaggerated effects among African American women in particular, compared to African American men or White women.[15,56,74,75] These studies suggest that vicarious racism may be an important health hazard to consider given its salience and prevalence particularly among African American women.[70,76]

As is the case for direct interpersonal discrimination, as a source of stress, vicarious racism may negatively impact health outcomes through mental health, behavioral, as well as physiologic channels.[46,48,77] Recurring experiences of race-related stress may lead to premature biological aging through dysregulation of systems involved in the stress response.[78] Cumulative exposure to stress elicits a cascade of biological processes mediated by the hypothalamic-pituitary-adrenal axis and sympathetic nervous system which, over time, can cause the "wear and

tear" of physiologic systems and accelerate disease progression.[15,79] Accordingly, repetitive experiences of acute stress results in a heightened inflammatory state, including elevated levels of proinflammatory cytokines and acute-phase proteins which have been linked with premature aging of cells.[80,81] Racial discrimination has been associated with biomarkers of inflammation, including C-reactive protein and interlukin-6; these indicators have in turn been linked with worse SLE processes.[82–85] Exposure to vicarious racism may similarly exacerbate disease progression by undermining inflammatory stress-response pathways that have been associated with heightened SLE activity.[18,27,86]

The Current Study.

In an age of increasing media coverage, accessibility of information, and nationally-publicized events, exposure to vicarious racism may play an increasing role in the health of individuals, especially those with chronic illness.[76] Although direct discrimination has been established as a harmful psychosocial stressor to health, research on the effects of witnessing or observing acts of racism are in their infancy. Furthermore, there are very few studies to our knowledge which explicitly examine vicarious racism in relation to adult physical health, and none in the context of SLE. In this study we examine whether exposure to vicarious racism stress in addition to direct interpersonal experiences of everyday discrimination are associated with heightened disease activity among African American women with SLE.

Methods

Participants are from the Black Women's Experiences Living with Lupus (BeWELL) Study.[19] The BeWELL Study recruited 439 African American women from the Georgians Organized Against Lupus (GOAL) cohort, largely from a population-based registry of SLE cases in metropolitan Atlanta, Georgia, with supplemental sampling of participants from the Lupus

Clinic of Grady Memorial Hospital, a large public hospital system; through private community rheumatologist practices. Overall, BeWELL represents a full spectrum of participants with validated SLE of varying severity and from varying levels of socioeconomic strata.[19,87] Data were collected from April 2015 to April 2017 by lay trained research assistants, primarily at offices of the Division of Rheumatology of the Emory University School of Medicine on the Grady Memorial Hospital campus. Basic socio-demographic measures, health history, and SLE outcomes were interviewer-assessed; more sensitive measures, including those around racial discrimination and vicarious racism, were self-reported using computer-assisted technology. All protocols and procedures were approved by the Institutional Review Board of Emory University.

Measures

SLE Disease Activity. SLE is characterized by periods of acute disease flares that wax and wane often unpredictably and are sensitive to psychosocial stress. Flares of disease activity are associated with several SLE outcomes and irreversible organ damage.[88] The Systemic Lupus Activity Questionnaire (SLAQ) is a validated, self-administered questionnaire that assesses the presence and severity of twenty-four clinical manifestations over the previous three months.[88,89] Symptoms of disease activity include weight loss, fatigue, fevers, oral ulcers, malar rash, photosensitivity, vasculitis, other rashes, alopecia, lymphadenopathy, dyspnea, chest pain, Raynaud's phenomenon, abdominal pain, paresthesia, seizures, stroke, memory loss, depression, headaches, myalgias, muscle weakness, arthralgias and joint swelling.[88] Items comprising the SLAQ are weighted and summed, ranging from 0-44 with higher scores representing greater disease activity.

Vicarious Racism Stress. Vicarious racism was measured as the mean of 4-items developed for the BeWell Study based on previous literature.[90] Participants were asked to rate on

a four-point scale from 0 (not at all) to 3 (very much; $\alpha = .83$) how "distressed or bothered" they are in response to each of the following situations: hearing people being the victims of racism in the news, hearing about family members or friends who have experienced racism, seeing other people in public being treated unfairly because of their race, and seeing racism depicted in movies or television shows.

Everyday Discrimination. Routine interpersonal experiences of racial discrimination were measured using the 10-item Everyday Discrimination scale (EDS).[91] The EDS is a commonly used self-report instrument which assesses the frequency of chronic, day-to-day experiences of unfair treatment, including experiences of being treated with less respect or courtesy, being called names or insulted, and receiving poorer service compared to others. In the current study, the EDS was modified to examine these experiences specifically due to race. We examined the mean response choice across items, which ranged in value from 0 (never) to 5 (almost every day).

Covariates. Age in years was measured based on date of birth. Years since diagnosis was calculated based on response to one of the following: the number of years and months since being diagnosed; the month and year of diagnosis; or the age of diagnosis.

Socioeconomic variables included measures of education (less than high school, high school, some college, college graduate or advanced degree), work status (full-time, part-time; out of labor force, including retired, homemaker, or student; and not working, including those unemployed, laid-off, or unable to work due to health or disability), insurance status (private, public, none), and ratio of household income to the poverty threshold. Household income in the past month was reported in categories of $500 increments from which we took the midpoint of the response category and multiplied by 12. For those who volunteered their past year household

income, responses were recorded in categories of $5,000 increments, from which we took the category midpoint to represent annual household income. A follow-up question assessed whether the figure reported was before or after taxes; for those reporting that it was after taxes, we calculated the pre-tax amount based on Georgia income tax rates for participant interview year.[92] The poverty ratio was based on number of adults and children in the household, according to Federal Poverty Thresholds for participant interview year.[93]

Health-related variables included body mass index (BMI; defined as weight in kilograms divided by the square of height in meters), measured continuously and based on measured height and weight; self-reported current smoking status (0=no, 1=yes); current SLE medication use (0=no, 1=yes) of the following: steroids (e.g., prednisone, medrol, methylprednisolone), antimalarials (e.g., hydroxychloroquine sulfate), and other less commonly used immunosuppressant drugs (e.g., methotrexate, cyclophosphamide, cyclosporine, mycophenolate, dapsone, azathioprine, benlysta, rituximab, ethanercept, adalumumab, infliximab, and others). In addition, cumulative SLE damage was measured using the Brief Index of Lupus Damage (BILD), a validated, interviewer-administered measure of physician-diagnosed major irreversible damage in 12 organ systems due to SLE.[94]

Analyses

Missing data. Four participants had missing data on household income. Eleven participants reported their household income but were missing data on whether it was before or after taxes. For these participants, we took the average between the corresponding pre-tax amount assuming the figure reported was after-taxes, and with the amount that was reported assuming it was prior to taxes. Missing data on other variables were: vicarious racism stress = 1 participant; everyday discrimination = 2 participants; education level = 1 participant; smoking

status = 1 participant. Seven participants with missing data on any variable were excluded from analyses, yielding a final analytic sample size of 432.

Analysis plan. A series of regression models examining predictors of SLE activity were estimated using SAS version 9.4 (SAS Institute, Cary, NC). Initial models individually examined vicarious racism stress and everyday discrimination with SLE activity, adjusting for age and years since diagnosis. Final models entered socioeconomic (Model 1) and health-related (Model 2) covariates in block groups. Model 3 adjusted for all covariates, including everyday discrimination. Post hoc analyses examined model diagnostics and potential moderation effects of vicarious racism stress and everyday discrimination on SLE activity.

Results

Descriptive statistics are presented in Table 1. The average SLE activity score for the analytic sample was 15.91 (SD=7.98; possible range 0-44). The average participant included in the analytic sample was 46.85 years old (SD=12.31) and was diagnosed with SLE for 16.04 years (SD=10.45). Among our sample, participants reported being highly distressed or bothered in due to vicarious exposure to racism (M=2.54; SD=0.59). Participants most frequently reported experiencing at least some form of racial discrimination less than once per year, with only 49 participants reporting no racial discrimination. Bivariate correlations indicated significant associations between vicarious racism stress and SLE activity ($r = 0.11$; $p < 0.05$); everyday discrimination and SLE activity ($r = 0.16$; $p < 0.001$); and vicarious racism stress with everyday discrimination ($r = 0.17$; $p < 0.001$). Additional bivariate correlations and sample characteristics are presented in Table 1.

Initial models examined individual associations of vicarious racism stress and everyday discrimination on SLE activity, adjusting for age and years since diagnosis. Individually, both

vicarious racism stress (b=1.49, 95% Confidence Intervals (CI):0.20, 2.77) and everyday discrimination (b=1.38, 95% CI:0.60, 2.17) were positively associated with disease activity.

Results from multivariable analyses for final models adjusting for additional covariates are shown in Table 2. Building off initial models, vicarious racism stress remained significantly associated with SLE activity after adjusting for socioeconomic covariates (Model 1; b=1.96, 95% CI:0.77, 3.15) and health-related covariates (Model 2; b=2.18, 95% CI:1.06, 3.29). When models were further adjusted for everyday discrimination (Model 3; b=1.12, 95% CI:0.41, 1.84), vicarious racism stress remained significantly associated with SLE activity (b=1.83, 95% CI:0.70, 2.95).

Regression diagnostics were conducted to check for influential observations and outliers. Tests consistently revealed three observations with high values of Cook's D and DFITS which indicate observations with the greatest residual and leverage. Removing these observations did not lead to substantively different conclusions; however, effect estimates for primary variable vicarious racism stress increased (b=2.24, 95% CI:1.12, 3.36) but stayed consistent for everyday discrimination.

Additional analyses were performed to examine moderation between vicarious racism and racial discrimination using the corresponding mean-centered terms and their interaction. We found no evidence for effect modification (b=0.27, 95% CI:-0.93, 1.46).

Discussion

Only a handful of studies have examined how racial discrimination and race-related incidents may have collateral effects on individuals beyond the immediate victim. Accordingly, scholars have highlighted the need for future research to examine vicarious racism in the context of racial inequities in health.[78,95,96] This study is the first to our knowledge that examines

vicarious racism stress and direct experiences of racial discrimination in relation to disease severity specifically in the context of SLE. After adjusting for covariates, we found that both greater reports of vicarious racism stress and direct experiences of discrimination were positively associated with SLE activity. Our results support previous research suggesting that the secondhand exposure to acts of racism and race-related stress may exacerbate disease processes and contribute to racial disparities in health. Findings from this study indicate that similar to more commonly studied direct experiences of racial discrimination, exposure to vicarious racism stress may have detrimental consequences for SLE outcomes, and health more broadly.

Results from this study are consistent with previous research on direct experiences of racial discrimination and health.[18] Direct experiences of racial discrimination have been well-established as harmful psychosocial stressors which may affect health through pathways involved with physiological "weathering".[15,97] Studies have found that racial discrimination is associated with biomarkers of inflammation that are relevant to SLE activity. However, relatively few studies have examined how witnessing, hearing about, or observing acts of discrimination and racism may affect physical health. Our findings fare consistent with emerging conceptualizations of "linked lives" which posit that the direct experiences of others may be shared among members of the same social group, and that such experiences may also become embodied.[51,52,78] Such indirect exposures to racism-related trauma have deleterious effects on health.[17,49,70,98,99] Recent studies have shown dysregulated physiologic reactivity in response to race-related stressors, both in laboratory settings and naturally-occurring experiments.[62,76,78,100] For example, the 2006 Duke lacrosse scandal robustly demonstrated the effects of a racially divisive campus climate on Black students' heightened baseline cortisol and blunted stress response.[56] Similarly, exposure to racist vignettes in the lab have produced greater adverse

physiologic responses in comparison to similar, but non-racist stimuli.[64,66,101,102] Other studies have examined the effects of parental experiences of discrimination on their children's mental health, and other childhood exposures to vicarious racism, although findings have been mixed.[50,103] Taken together, results from this study contribute to the increasing documentation on the health effects of vicarious exposure to race-related stress.

Our findings advance the literature on vicarious racism stress, direct racial discrimination, and health outcomes in several ways. Research on vicarious racism has focused almost exclusively in the context of childrearing (e.g., caregiver-experienced discrimination or offspring-experienced discrimination); in laboratory settings; with non-Black samples; with emphasis on mental health outcomes; or with measures which assess direct and indirect discrimination concurrently.[50,63,66,73,90,104–109] This is one of few studies that examines vicarious racism stress in relation to physical health outcomes in a relatively large sample of adult African American women. While previous research on vicarious racism and child health has produced inconsistent findings – likely in part due to delayed detection of chronic disease indicators – our results provide evidence of the deleterious effects of exposure to vicarious racism stress among adults using self-reported disease activity. Additionally, findings from this study suggest that vicarious racism stress has negative effects on SLE activity independent of direct experiences of racial discrimination. This is important to consider in light of the continued perpetration and increasing visibility of racism, and a broader hostile racial climate. Recent reports indicate that African Americans experience direct racial discrimination across a variety of domains and 92% believe that discrimination against African Americans is prevalent in America today.[110] Moreover, the modern age of social media, news coverage, and constant stream of nationally

publicized events serves to amplify the pervasiveness of vicarious racism and its potential effects on health.[76,111,112]

Several study limitations are important to note. Conclusions regarding the causal direction cannot be determined given the cross-sectional nature of the data. However, our interpretation is consistent with other literature showing that direct experiences of racial discrimination may lead to poor disease outcomes. Furthermore, BeWELL participants are from a specific geographic area and our results may not be generalizable to those living in other regions of the US. Another limitation is the self-report nature of SLE activity. Moving forward, longitudinal and nationally representative data will be critical in understanding how exposure to vicarious racism stress may be associated with changes in SLE activity and other objective measures of disease, over time.

Despite these limitations, this study advances the scientific literature on the social epidemiology of SLE and is the first to provide evidence of the deleterious health effects of vicarious racism stress, an understudied dimension of racism, in the context of this disease. Importantly, findings from this study have critical implications considering heightened racial tensions and visibility of racism. In addition to longitudinal examinations, future research should study potential mediators and moderators of this relationship, in part to identify protective factors that may buffer the effects of vicarious racism stress on SLE outcomes. Moving forward, "secondhand" exposure to racism should also be considered a potential health risk factor more broadly. Results from this study highlight the need to address racial health inequities and eliminate racial discrimination from society.

Table 1. Descriptive Characteristics of African American Women with Systemic Lupus Erythematosus (SLE), Bivariate Relationships with Disease Activity (SLAQ), and Mean SLAQ Scores: BeWELL Study, 2015-2017 (n=432)

	n (%) or M (SD)	Mean SLAQ (SD)
SLE Activity (SLAQ), M (SD)	15.14 (7.98)	
0 – 9, n (%)	113 (26.16)	
10 – 19	198 (45.83)	
≥ 20	121 (28.01)	
Vicarious Racism Stress, M (SD)*	2.54 (0.59)	
0 – 1, n (%)	17 (3.94)	13.29 (9.85)
1.01 – 2	81 (18.75)	13.81 (7.27)
2.01 – 3	334 (77.31)	15.56 (8.01)
Everyday Discrimination, M (SD)***	1.23 (0.95)	
0 – 1, n (%)	208 (48.15)	13.65 (7.90)
1.01 – 2	145 (33.56)	16.33 (7.46)
2.01 – 3	58 (13.43)	15.90 (8.62)
3.01 – 4	19 (4.04)	19.95 (7.51)
4.01 – 5	2 (0.46)	16.50 (10.61)
Age, M (SD)	46.85 (12.31)	
18 – 34, n (%)	84 (19.44)	14.67 (8.12)
35 – 49	168 (38.89)	15.28 (8.34)

50 – 64	152 (35.19)	15.66 (7.75)
≥ 65	28 (6.38)	12.93 (6.35)
Years Since Diagnosis, M (SD)	16.04 (10.45)	
< 10, n (%)	145 (33.56)	15.80 (8.03)
10 – 19.9	153 (35.42)	14.57 (8.14)
≥ 20	134 (31.02)	15.08 (7.73)
Education, n (%)***		
Less than high school	36 (8.33)	17.33 (7.47)
High school	78 (18.06)	15.97 (7.22)
Some college	196 (45.37)	16.61 (7.59)
≥ B.S. or equivalent	122 (28.24)	11.60 (8.15)
Work Status, n (%)***		
Full-time	124 (28.7)	11.70 (7.71)
Half-time	54 (12.5)	13.24 (7.03)
Out of labor force	21 (4.86)	12.95 (7.91)
Not working	233 (53.94)	17.61 (7.50)
Insurance Status, n (%)***		
Private	155 (35.88)	12.57 (7.77)
Public	229 (53.009)	16.87 (7.61)
None	48 (11.11)	15.19 (8.27)
Income-to-Poverty Ratio, M (SD)***	2.01 (1.68)	
≤ 1, n (%)	135 (31.25)	17.13 (8.05)
1 – 1.99	145 (33.56)	16.25 (7.49)

2 – 3.99	103 (23.84)	13.38 (7.92)
≥ 4	49 (11.34)	10.10 (6.45)
Body Mass Index,[a] M (SD)[*]	30.92 (8.10)	
< 18.5, n (%)	10 (2.31)	14.50 (8.17)
18.5 – 24.9	101 (23.38)	14.94 (8.04)
25 – 29.9	107 (24.77)	14.31 (8.32)
≥ 30	214 (49.54)	15.68 (7.78)
Smoking Status, n (%)[***]		
No	370 (85.65)	14.52 (7.81)
Yes	62 (14.35)	18.85 (8.03)
Steroids, n (%)[***]		
No	192 (44.44)	13.54 (7.47)
Yes	240 (55.56)	16.43 (8.15)
Hydroxychloroquine, n (%)[*]		
No	117 (27.08)	16.54 (8.52)
Yes	315 (72.92)	14.62 (7.72)
Other Immunosuppressants, n (%)		
No	240 (55.56)	14.98 (7.93)
Yes	192 (44.44)	15.34 (8.06)
SLE Damage (BILD), M (SD)[***]	2.78 (2.51)	
0	69 (15.97)	10.84 (7.54)
1 – 2	173 (40.05)	14.43 (7.22)
3 – 4	103 (23.84)	15.83 (7.86)

≥ 5	87 (20.14	19.16 (7.98)	

Abbreviations: BeWELL, Black Women's Experiences Living with Lupus; M, mean; SD, standard deviation.

[a] Body mass index calculated as (weight in kilograms) / (height in meters)^2

Bivariate correlations with SLAQ indicated with * p <0.05, ** p < 0.01, *** p <0.001

Table 2. Results from regression models examining predictors of disease activity among African American women in the Black Women's Experiences with Lupus (BeWELL) Study (2015-2017).

	Model 1 b (95% CI) [a]	Model 2 b (95% CI) [b]	Model 3 b (95% CI) [c]
Vicarious Racism Stress	1.96 (0.77, 3.15)	2.18 (1.06, 3.29)	1.83 (0.70, 2.95)
Age	0.02 (-0.05, 0.09)	-0.01 (-0.08, 0.06)	-0.01 (-0.08, 0.06)
Years Since Diagnosis	-0.04 (-0.12, 0.04)	-0.08 (-0.16, 0.00)	-0.08 (-0.15, 0.00)
Education (ref: < High School)			
High School	-0.92 (-3.84, 2.00)	-0.48 (-3.24, 2.29)	-0.22 (-2.96, 2.52)
Some College	0.19 (-2.45, 2.83)	-0.01 (-2.50, 2.49)	-0.16 (-2.63, 2.31)
≥ B.S. or Equivalent	-2.42 (-5.36, 0.52)	-1.96 (-4.77, 0.85)	-2.25 (-5.04, 0.54)
Work Status (ref: Full-Time)			
Half-Time	-0.19 (-2.73, 2.36)	-0.59 (-3.00, 1.82)	-0.68 (-3.06, 1.71)
Out of Labor Force	1.16 (-2.49, 4.80)	1.47 (-1.98, 4.93)	1.64 (-1.78, 5.06)

Not Working	3.83 (1.76, 5.90)	2.27 (0.24, 4.30)	2.30 (0.29, 4.31)
Insurance Status (ref: Private)			
Public	-0.54 (-2.56, 1.49)	-0.64 (-2.54, 1.25)	-0.43 (-2.31, 1.45)
None	-1.31 (-3.92, 1.31)	-0.96 (-3.41, 1.50)	-0.67 (-3.11, 1.77)
Income-to-Poverty Ratio	-1.05 (-1.57, -0.52)	-0.98 (-1.47, -0.48)	-0.94 (-1.43, -0.45)
Body Mass Index		0.11 (0.03, 0.19)	0.08 (0.00, 0.17)
Smoker: yes vs no		3.51 (1.59, 5.44)	3.19 (1.27, 5.10)
Steroids: yes vs no		1.87 (0.43, 3.30)	1.92 (0.50, 3.35)
Hydroxychloroquine: yes vs no		-1.24 (-2.77, 0.28)	-1.25 (-2.76, 0.26)
Other Immunosuppressants: yes vs no		-0.28 (-1.70, 1.14)	-0.27 (-1.68, 1.13)
SLE Damage (BILD)		0.85 (0.57, 1.14)	0.82 (0.53, 1.11)
Everyday Discrimination			1.12 (0.41, 1.84)

Note: CI = confidence interval. The sample size was 432.
[a] Controlling for initial model covariates (age and years since diagnosis) + socioeconomic covariates.
[b] Model 1 + health-related covariates.
[c] Model 2 + Everyday Discrimination.

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