Disentangling Race and Socioeconomic Status in Health Disparities Research:

An Examination of Black and White Clergy

AUTHORS

Andrew D. Case
Department of Psychological Science
University of North Carolina at Charlotte

David E. Eagle
Center for Health Policy & Inequalities Research
Duke University

Jia Yao
Duke Global Health Institute, Duke Center for Health Policy & Inequalities Research
Duke University

Rae Jean Proeschold-Bell
Duke Global Health Institute, Duke Center for Health Policy & Inequalities Research
Duke University

Corresponding author:
Andrew D. Case
Department of Psychological Science
University of North Carolina at Charlotte
acase8@uncc.edu

Abstract

Aim: Sophisticated adjustments for socioeconomic status (SES) in health disparities research may help illuminate the independent role of race. In this study of people who share the same occupation (United Methodist Church clergy) and state of residence (North Carolina), we employed naturalistic and statistical matching to estimate the association between race—above and beyond present SES and other potential confounds—and health disparities. Methods: We compared the health of 1,414 White and 93 Black clergy. Then, we used propensity scores to match Black and White participants on key socioeconomic, demographic, occupational, and physical activity characteristics and re-examined differences in health. Results: Prior to propensity score matching, Black clergy reported worse physical health than their White counterparts. They had greater body mass index, higher prevalence of diabetes and hypertension, and lower physical health functioning. White clergy reported less favorable mental health. They had higher severity of depression and anxiety symptoms as well as lower quality of life and mental health functioning. Propensity score analysis revealed that matching on SES and other key variables accounted for most, but not all, of the observed racial differences. Racial disparities in hypertension, depression severity, and mental health functioning persisted despite adjustments. Conclusions: Race contributed to health disparities in some outcomes in our study population, above and beyond our measures of participants' present SES and key demographic, occupational, and physical activity variables. This study provides evidence supporting the position that race contributes to health disparities through pathways other than SES.

KEYWORDS
Race; Socioeconomic status; Health disparities; Clergy; Propensity score matching

This is a post-peer-review, pre-copyedit version of an article published in Journal of Racial and Ethnic Health Disparities. The final authenticated version is available online at: http://dx.doi.org/10.1007/s40615-017-0449-7.
The full article citation is: Case, A. D., Eagle, D. E., Yao, J., & Proeschold-Bell, R. J. (2017). Disentangling Race and Socioeconomic Status in Health Disparities Research: An Examination of Black and White Clergy. *Journal of Racial and Ethnic Health Disparities*, *5*(5), 1014–1022. doi: 10.1007/s40615-017-0449-7.

Introduction

Increasingly, researchers are examining how socioeconomic status (SES) and race jointly and independently contribute to Black-White disparities in health [1-6]. Some argue that sophisticated controls for SES across racial groups are needed to better estimate the independent effects of race on health disparities [2, 6]. However, conceptual and methodological challenges have impeded efforts to adequately control for the influence of SES on health. For example, as Do and colleagues [2] argue, linear models may not adequately control for SES mostly due to inadequate overlap between Blacks and Whites on SES variables, resulting in significant bias in race coefficients. In addition, in the United States, SES and race are tightly intertwined, making it difficult to parse their independent effects on health from their combined ones. For example, racial discrimination in the form of segregation can have indirect effects on health through fewer health-promoting community resources (e.g., green space, health care) in predominantly Black neighborhoods [2, 3].

The goal of this study was to better estimate the independent contribution of race to racial disparities in health by using a multifaceted approach to controlling for SES. We used a relatively homogeneous sample of United Methodist Church (UMC) clergy in North Carolina and propensity score matching to develop estimates of the relationship of race with important indicators of mental and physical health. Propensity score matching is a non-parametric approach that attempts to estimate the effect of being in the "treated" group (in this case, being Black) versus the "untreated" group (i.e. White) in the presence of a set of control variables. While the language of propensity score matching comes from experimental methods, the technique is routinely applied to observational studies where the researcher cannot assign people to different "treatment" arms [7]. A traditional approach using linear regression can fail if there is imbalance in the covariates (i.e., there are large differences between groups on key control variables). In this situation, propensity score methods tend to perform better.

Racial Disparities in Health

In the US, race demarcates striking disparities in physical health. Blacks compared to Whites have lower life expectancies and higher prevalence rates of cardiovascular disease, diabetes, and obesity [8]. The picture surrounding mental health is more complex. Studies indicate that Blacks report lower rates of lifetime mood, anxiety, and substance abuse disorders than Whites

[9]. While the lifetime risk of major depression is lower for Blacks, those experiencing depression often report more severe symptoms and a longer course of illness [10].

Researchers have argued that SES is a significant contributor to these disparities [6, 11-12]. Specifically, less education, income, access to healthcare, and occupational control among Blacks compared to Whites leads to poorer physical health outcomes among Blacks [1, 5]. Similarly, some scholars argue that the relative lack of access to quality mental health care for Blacks explains their longer course of illness and greater symptom severity [9]. Consistent with these arguments, some studies have found that socioeconomic status (SES) fully or substantially mutes observed disparities for some health outcomes [2, 3]. However, as noted, it is difficult to parse what role race may play above and beyond the socioeconomic differences between Blacks and Whites [1, 2].

Health effects more directly related to race have also been posited and examined. The cumulative effect of stress due to adverse race-related experiences such as discrimination and being a minority is argued to contribute to health disparities [13]. Some studies have found racism-related stress to be associated with unfavorable cardiac reactivity (e.g., high blood pressure; low heart rate variability) and maladaptive coping strategies (e.g., smoking, excess alcohol consumption), which are known to undermine health status [14-16]. While SES may influence the degree to which racism is experienced, all Blacks are potentially subject to discrimination-related stress.

Purpose of the Study

The reviewed findings suggest that Blacks may face a type of "double jeopardy" in which SES *and* race-related experiences contribute to health disparities [17, 18]. Because these factors are intertwined, estimating the SES-independent relationship of race with health disparities is a challenge. We sought to better estimate the direct effect of race on health disparities by applying more precise controls for SES. First, we selected a study population with the same employer, profession, and state of residence. This represented a naturalistic control for key occupational and demographic characteristics. Second, we used propensity score matching to reduce covariate imbalance and improve overlap between Black and White participants on SES, occupational characteristics, physical activity and demographic variables.

Methods

Data

Data came from the 2012 wave of the [Institution] Clergy Health Initiative (CHI) Longitudinal Survey, a multi-year, online panel survey that focused on the physical and mental health of United Methodist Clergy in North Carolina. In 2008, all active and appointed United Methodist clergy in North Carolina were invited to participate in this study. All of these participants, along with newly appointed clergy, were added to subsequent waves of the survey, which were conducted in 2010 and 2012. We chose to analyze the 2012 survey, which contained the largest number of Black clergy. In total, 1,777 clergy participated, representing an 81.3% response rate. Response rates did not differ significantly by race.

Measures

Black-White disparities in the health of this population were quantified using several measures of physical and mental health outcomes, which are described below.

Body Mass Index (BMI) was calculated from the respondent's self-reported height and weight with the following formula: BMI = 703 × weight (lb) / [height (in)]^2. While people tend to under-report their weight [19], we assume that under-reporting is relatively consistent between Blacks and Whites, making it possible to compare inter-group differences.

The presence of chronic health conditions were measured with questions that asked the respondents to report if they had ever been told by a medical professional that they had any of the following conditions: diabetes (this included reports of a diagnosis of either diabetes or pre/borderline diabetes), hypertension (this included reports of a diagnosis of either hypertension or pre/borderline hypertension), high "bad" cholesterol, joint problems, and asthma. These questions used the same wording as the Behavioral Risk Factor Surveillance System (BRFSS) a survey developed by the Centers for Disease Control and Prevention (CDC) with the purpose, among other things, of identifying the prevalence of chronic health conditions in the US population [20].

Physical health functioning and mental health functioning were measured using the Medical Outcome Study Short Form-12, version 1 (MOS SF-12 v1). The MOS SF-12 v1 is a widely used and validated self-administered 12-item questionnaire that assesses self-reported physical and mental health [21]. The Physical Component Summary (PCS-12) score and the Mental Component Summary (MCS-12) score are weighted averages of the 12 items, which summarize respondent's health-related physical functioning and mental functioning respectively. Both scores can range from 0 to 100, with higher scores indicating better health functioning. In the general US population, both the PCS-12 scores and the MCS-12 scores have means of 50 and standard deviations of 10.

Depressive symptoms were measured using the Patient Health Questionnaire-9 (PHQ-9), which consists of nine items assessing frequency of depressive symptoms in the past two weeks [22]. Scores range from 0 to 27, with higher scores indicating higher depression symptoms severity. In the current study, the measure's reliability coefficient (Cronbach's alpha) was 0.87. Cutpoints of 5, 10 and 15 on the PHQ-9 represent mild, moderate and severe depressive symptom levels respectively. Depressive cases were identified for participants who reported PHQ-9 scores of 10 or higher [22].

Anxiety symptoms were measured using the Hospital Anxiety Depression Scale-Anxiety (HADS-A) [22] which is a seven-item measure assessing anxiety symptoms. Scores range from 0 to 21, with higher scores indicating higher anxiety symptoms severity. In this study, the internal reliability coefficient (Cronbach's alpha) was 0.76. Optimal balance between sensitivity and specificity for HADS as a screening instrument was achieved most frequently at a cut-off score of 8+ [24]. Anxious cases were identified for participants who reported HADS-A scores of 8 or higher.

Quality of life was measured using 15 items from the Quality of Life Inventory (QOLI), which consists of 16 items each measuring one domain of participant's life satisfaction, for example, "How satisfied are you with your current health?" and "How satisfied are you with your current goals and values?" One item in the original QOLI on life satisfaction with friends was excluded. Respondents rated their satisfaction using a six-point scale [25]. Scores were calculated as unweighted sum and range from 15 to 90, with higher scores indicating higher perceived quality of life. In this study, the reliability coefficient (Cronbach's alpha) was 0.91.

Measuring Race**.** Key to our study was measuring race, which was measured as the respondent's self-reported answer to the following question, "Which of the following racial categories best describe you?" Respondents could select all that applied. Respondents were coded as *Black* if they selected "African-American" as their only racial category. Likewise, those who selected "White" as their only racial category were coded *White*. All others, including those who chose multiple racial categories, were dropped from the analysis.

Covariates Used for Matching. Black and White respondents were matched using variables that measured SES, demographic characteristics, occupational characteristics and other health-related factors. Theses variables were chosen in order to create as balanced a group of Black and White respondents as possible.

SES was measured using the respondent's self-reported of their education*,* coded *high-school/high-school equivalent or less* (reference), *bachelor's degree or equivalent*, *Master's degree* (including Master of Divinity), and *doctoral degree* (PhD, ThD or Doctor of Ministry); and their total annual individual income, measured in dollars, from all sources. For cases where clergy lived in a congregationally provided parsonage, we estimated the rental equivalent of the parsonage, including utilities, and added it to their annual individual income. While SES typically includes measures of occupation and occupational status, given the homogeneity of our sample, these controls were not deemed necessary.

We also matched Black and White respondents on a number of occupational characteristics we hypothesized could be related to health. First, their status of employment*,* is a three-level variable coded *appointed full-time* (reference) if the pastor reported to being actively employed for 40 or more hours per week, *appointed part-time* if they reported being actively employed but working less than 40 hours per week and *retired/on-leave.* We also measured whether participant was pastoring a church with the majority of congregants being a different race from the participant's race, coded as *same-race* (reference) or *cross-racial;* how many hours per week the participant worked; how many years the participant had been serving in UMC; the number of appointments the participant had served since they became a UMC clergy member; the number of moves experienced by the pastor since they began their career as a pastor; gender, coded *male* (reference) or *female*; age; marital status, coded *married* (reference) or *not married*; whether participant resided in a rural area; health insurance status, coded as *insured* (reference) or *not insured*; and number of minutes spent in physical exercise per week.

Analytic Strategy

Only clergy who self-identified as White or Black/African American were included in the analysis (*N*=1,507). We summarized sociodemographic and health characteristics by race, using means and standard deviations (SD) for continuous measures, and using counts and percentages for categorical measures. We then conducted t-tests on continuous outcomes and chi-square tests on categorical outcomes to identify differences between Blacks and Whites.

To estimate the association of race with health net of potential confounding covariates, we created a sample of Black clergy matched to similar White clergy. Similarity was determined by calculating a propensity score [26, 27]. Using propensity scores to balance covariates is generally seen as superior to traditional covariate adjustment techniques [28, 29]. One major problem with conventional regression techniques is, owing to the major disparities between Blacks and Whites, there may not be sufficient covariate overlap between the two groups to

generate non-biased estimates of between-group differences. Propensity score matching helps test and adjust for covariate imbalance between the groups [29].

To estimate propensity scores, we used a logistic regression with the following covariates: gender, age, marital status, highest educational achievement, income, rural vs urban residence, employment status (full-time vs part-time vs retired/on leave), number of moderate exercise minutes per day, number of vigorous exercise minutes per day, health insurance status, and pastoring a congregation of a predominantly different race [30]. Each Black participant was matched with one White participant using one-to-one nearest-neighbor matching. In order to obtain the best match for each Black participant, each White participant could be matched to more than one Black participant. Standard errors were adjusted to account for the fact that White respondents could be present in these data multiple times.

With the matched sample, we calculated the average "treatment" effect on the treated (ATT). In this context, "treatment" is used loosely and reflects the fact that propensity score methods originate in experimental designs. Propensity score methods allowed us to construct a sample of Black and White respondents with balanced covariates. The ATT yielded an estimate of the difference due to race between White and Black respondents. All analyses were conducted using Stata software (Version 14), with matching performed using the *teffects psmatch* command [31].

Results

Bivariable Analyses

Tables 1 and 2 present descriptive statistics for health and demographic data. Participants consisted of 1,507 clergy, 93 (6.2%) of whom were Black. The proportion of Black clergy in North Carolina is representative of the United Methodist Church nationally and matches data from the denomination on the proportion of Black clergy in the state [32]. Blacks had statistically significantly higher prevalence of diabetes (35.5% vs. 20.4%; p= .003) and hypertension (67.7% vs. 43.1%; p< .001) than Whites. Blacks also had significantly higher mean BMI values (31.3 vs. 29.5; p= .012) and lower (i.e., worse) mean physical health functioning scores (2.0 points lower on a scale of 0-100; p= .026).

Black clergy had significantly higher (i.e., better) mean mental health functioning scores (4.0 points higher on a scale of 0-100; p< .001) and higher mean quality of life scores (2.6 points higher on a scale of 0-100; p= .037) than White clergy. Blacks had significantly lower mean depression severity scores (1.4 points lower on a scale of 0-27; p= .001) and lower mean anxiety severity scores (0.6 points lower on a scale of 0-21; p= .053). There was no evidence of a racial difference in depressive symptoms. However, the prevalence of anxiety cases was lower for Blacks than Whites (5.4% vs. 13.4%; p= .082).

Black clergy were, on average, 5 years older than White clergy (58 vs. 53; p< .001), less likely to be married (73% vs 89%; p < .001) and more likely to be divorced (18% vs. 7%; p < .001) (Table 2). A higher proportion of Black clergy had a doctoral degree (22% vs. 12%), as well as only an undergraduate degree or less (26% vs. 18%, p=.020). On average, Black clergy earned less than White clergy ($38,500 vs. $50,600; p< .001), worked fewer hours per week (42 vs. 46; p = .008), and had served fewer lifetime appointments (3.6 vs. 4.1; p= .065). A greater proportion of Black clergy were appointed to a congregation predominantly not of their own

race (24% vs. 4%, $p<0.001$). Black clergy reported fewer lifetime moves due to reappointment (2.2 vs. 3.4, $p< .001$).

Propensity Score Matching

In Table 3, we report the differences between Whites and Blacks in the matched sample (i.e., the ATT). Given that some outcomes were missing, this approach was able to match between 83 and 92 of the 93 Blacks in our study, with a range of 77-83 White participants as matches (including replicate matches). Two techniques were used to evaluate the quality of our matching procedure [28]. First, we calculated the differences in propensity scores for our Black versus White sample. The average propensity score among Blacks was 0.15 and 0.14 among Whites. Second, we calculated the standardized mean difference (SMD) in the value of the covariates between Blacks and Whites in the matched sample. Nine of the eleven covariates had SMD's of 0.1 or less, which is a generally acceptable rule for calculating adequate covariate balance [29]. Two of the covariates had SMD's greater than 0.1: vigorous exercise (0.18) and education (0.15).

Physical Health: No evidence of racial differences in BMI, physical health functioning, and diabetes were identified between matched Black and White clergy. However, for hypertension, significant racial differences remained between the matched groups. The prevalence of hypertension was 15.2 percentage points higher in Black clergy [95% CI: 2.4, 28.0] than in the matched sample of White clergy ($p = .020$).

Mental Health: Blacks scored significantly higher than matched Whites on the MCS-12, with scores 2.9 points higher on average ($p = .001$), indicating better mental health functioning. Blacks had significantly lower mean depression scores, with scores 1.8 points lower ($p = .003$), indicating fewer depressive symptoms. Between the matched groups, there was no evidence of racial differences in anxiety scores, the prevalence of anxiety, or quality of life.

Discussion

Despite having the same occupation and working in the same state for the same employer, we found significant health disparities between Black and White UMC clergy. Comparatively, Blacks reported poorer physical health and Whites reported worse mental health. When we utilized propensity score matching analysis to statistically control for SES and key demographic, occupational, and physical activity variables, some racial differences in health disappeared. Disparities remained in hypertension, depressive symptoms, and mental health functioning.

There are two potential explanations for the persistence of higher rates of hypertension among Blacks that, due to design of our study, we could not evaluate. First, it is possible that hypertension in Black clergy may reflect childhood exposure to adverse social and economic conditions such as poverty and crime [33-35]. Research suggests that racial disparities in hypertension begin in childhood; Black children evidence higher blood pressure than their White counterparts and Black hypertensive adolescents are more likely to report hypertension as adults than White hypertensive adolescents. Further research is needed to determine the extent to which childhood SES may contribute to health disparities in adulthood. The second explanation may reflect an independent effect of race on health. Specifically, racial differences in hypertension could be the result of the cumulative experience of racism and minority status resulting in higher rates of hypertension among Black clergy. Indeed, some studies have

revealed a positive association between reports of racial discrimination and blood pressure, while others report no difference [15, 37]. Further research that accounts for the effects of lifetime racism and minority experience on health is needed to evaluate this hypothesis.

Our findings indicated that White clergy experienced worse mental health than Black clergy. This consistent with some epidemiological studies that show Whites to have comparable or worse mental health than Blacks [9, 10]. It is also possible that Black clergy underreported their symptoms. Some research, for example suggests that Blacks and Whites may differ in symptom presentation [38]. Other research indicates that the stigma toward mental illness and the cultural value of being "strong" in the face of adversity may lead Blacks to minimize symptoms of depression and anxiety [39]. Another way this finding could be framed is that Blacks possess a mental health advantage related to Whites. For example, Black religiosity could possess a different relationship with mental health than White religiosity. Blacks are more likely to cope with illness using religion [36], and religious participation has been found to buffer the effects of discrimination on mental health for Blacks but not Whites [40]. Further, greater cohesiveness in Black churches may promote lower depressive symptoms in this subpopulation [41].

Limitations

This study's finding must be evaluated in light of certain limitations. First, a relatively small number of Black clergy participated in this study, possibly under-powering some analyses. To address this we conducted a sensitivity analysis whereby we explored a 2:1 propensity score matching analysis in which every Black clergy was matched with 2 White clergy who were the most similar to them The 2:1 matching analysis yielded similar results to the 1:1 matching: hypertension remained more prevalent in Blacks (coefficient=14.7%, 95% CI [4.3%, 25.0%]; p=.006); mental health functioning remained higher in Blacks (coefficient=3.61, 95% CI [2.40, 4.81]; p<.001), and depression severity scores remained lower in Blacks (coefficient=-1.55, 95% CI [-2.21, -0.89]; p<.001) compared to the matched Whites. No statistically significant differences were found between the Blacks and the Whites in other physical and mental health measures.

Our second limitation was that we did not achieve good covariate balance on vigorous exercise and education, which could have biased our results. A better balance between these variables may reduce the racial disparity in hypertension and mental health functioning. Third, our study may have suffered from omitted variable bias where we failed to measure variables that may be associated with health outcomes and race or that constituted SES. For example, while we assessed rural versus urban residence, we did not assesss socioeconomic status at the neighborhood level among our participants.

Last, this study was an exploratory examination to assess the independent association between race and health disparities. We acknowledge that the associations among SES, race, and health are complex and replete with many direct and indirect effects, not all of which we were able to control for in the study. Thus, further research is needed to parse these effects. Future research is also needed to identify the effect of potential non-SES and non-race factors such as marital status and hours worked per week.

Conclusions and Implications

In this exploratory study we employed a multifaceted approach to controlling for SES and other potential confounds in order to better examine the independent role of race in health disparities. We found that while our controls accounted for many of the racial differences in

health within our sample, some differences persisted. This finding lends support to the position that race, above and beyond present SES and other pertinent confounds may have and independent association with health differences between Blacks and Whites.

While this study focused on clergy in NC, its findings has important implications for research on racial disparities in health. First, it suggests that more sophisticated controls for SES such as propensity score matching may improve estimates of the independent association between race and health disparities. Second, it underscores the importance of more clearly understanding the complex pathways whereby both socioeconomic status and race (e.g., racism, minority status) influence health.

Acknowledgments

The first author's effort was supported in part by the Duke Global Health Institute Postdoctoral Fellowship program. This research was also supported by the Rural Church Area of The Duke Endowment. We are thankful to Glen Milstein, Celia Hybels, and Bryce Bartlett for their thoughtful feedback on an earlier version of this paper.

References

1. Phelan JC, Link BG. Is racism a fundamental cause of inequalities in health?. Annu Rev Sociol. 2015;41:311-330. doi:10.1146/annurev-soc-073014-112305
2. Do DP, Frank R, Finch BK. Does SES explain more of the Black/White health gap than we thought? Revisiting our approach toward understanding racial disparities in health. Soc Sci Med. 2012;74(9):1385-1393. doi:10.1016/j.socscimed.2011.12.048
3. Williams DR, Collins C. US socioeconomic and racial differences in health: patterns and explanations. Annu Rev Sociol. 1995;21(1):349–386. doi:10.1146/annurev.so.21.080195.002025
4. Stewart AL, Dean ML, Gregorich SE, Brawarsky P, Haas JS. Race/ethnicity, socioeconomic status and the health of pregnant women. J Health Psychol. 2007;12(2):285-300. doi:10.1177/1359105307074259
5. Williams DR. Race, socioeconomic status, and health: the added effects of racism and discrimination. Ann NY Acad Sci. 1999;896(1):173-188. doi:10.1111/j.1749-6632.1999.tb08114.x
6. Adler NE, Rehkopf DH. US disparities in health: descriptions, causes, and mechanisms. Annu Rev Public Health. 2008;29:235-252. doi:10.1146/annurev.publhealth.29.020907.090852
7. Rosenbaum, PR, Rubin, DB. The central role of the propensity score in observational studies for causal effects. Biometrika. 1983; 70(1):41-55.
8. Meyer PA, Yoon PW, Kaufman RB. CDC health disparities and inequalities report-United States, 2013. CDC Morbidity and Mortality Weekly Report Supplement. 2013;62(3):1-186. https://www.cdc.gov/mmwr/pdf/other/su6203.pdf.
9. McGuire TG, Miranda J. New evidence regarding racial and ethnic disparities in mental health: policy implications. Health Aff (Millwood). 2008;27(2):393-403. doi:10.1377/hlthaff.27.2.393

10. Breslau J, Kendler KS, Su M, Gaxiola-Aguilar S. Lifetime risk and persistence of psychiatric disorders across ethnic groups in the United States. Psychol Med. 2005;35(3):317-327. doi:10.1017/S0033291704003514
11. Phelan JC, Link BG, Tehranifar P. Social conditions as fundamental causes of health inequalities: theory, evidence, and policy implications. J Health Soc Behav. 2010;51 Suppl:S28–S40. doi:10.1177/0022146510383498
12. Hayward MD, Miles TP, Crimmins EM, Yang Y. The significance of socioeconomic status in explaining the racial gap in chronic health conditions. Am Sociol Rev. 2000;65:910-930. doi:10.2307/2657519
13. Clark R, Anderson NB, Clark VR, Williams DR. Racism as a stressor for African Americans: a biopsychosocial model. Am Psychol. 1999;54(10):805. doi:10.1037/0003-066X.54.10.805
14. Jackson JS, Knight KM, Rafferty JA. Race and unhealthy behaviors: chronic stress, the HPA Axis, and physical and mental health disparities over the life course. Am J Public Health. 2010;100(5):933-939. doi:10.2105/AJPH.2008.143446
15. Pascoe EA, Smart Richman L. Perceived discrimination and health: a meta-analytic review. Psychol Bull. 2009;135(4):531-554. doi: 10.1037/a0016059
16. Hill, LBK, Hoggard, LS, Richmond, AS, Gray, DLL, Williams, DP, Thayer, JF. Examining the association between perceived discrimination and heart rate variability in African Americans. Cul Div and Eth Min Psych. 2017;23(1):5-14.
17. Williams DR, Sternthal M. Understanding racial-ethnic disparities in health: sociological contributions. J Health Soc Behav. 2010;51Suppl:S15–27. doi:10.1177/0022146510383838
18. Farmer MM, Ferraro KF. Are racial disparities in health conditional on socioeconomic status?. Soc Sci Med. 2005;60(1):191-204. doi:10.1016/j.socscimed.2004.04.026
19. Gorber, SC, Tremblay, M, Moher, D, and Gorber, B. A comparison of direct vs. self-report measures for assessing height, weight and body mass index: a systematic review. Obesity Reviews, 2007;8:307–326. doi:10.1111/j.1467-789X.2007.00347.x]
20. Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System Survey Questionnaire. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; 2008.
21. Ware JE, Kosinski M, Keller SD. A 12-item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity. Med Care. 1996;34(3):220-233. http://www.jstor.org/stable/3766749.
22. Kroenke K, Spitzer RL, Williams JB. The PHQ-9. J Gen Intern Med. 2001;16(9):606-613. doi:10.1046/j.1525-1497.2001.016009606.x
23. Zigmond AS, Snaith RP. The Hospital Anxiety and Depression Scale. Acta Psychiatr Scand. 1983;67(6):361-370. doi:10.1111/j.1600-0447.1983.tb09716.x
24. Bjelland I, Dahl AA, Haug TT, Neckelmann D. The validity of the Hospital Anxiety and Depression Scale: an updated literature review. J Psychosom Res. 2002;52(2):69-77. doi:10.1016/S0022-3999(01)00296-3
25. Frisch MB, Cornell J, Villanueva M, Retzlaff PJ. Clinical validation of the Quality of Life Inventory. a measure of life satisfaction for use in treatment planning and outcome assessment. Psychol Assess. 1992;4(1):92-101. doi:10.1037/1040-3590.4.1.92

26. Abadie A, Drukker D, Herr JL, Imbens GW. Implementing matching estimators for average treatment effects in Stata. Stata J. 2004;4(3):290-311. http://www.stata-journal.com/sjpdf.html?articlenum=st0072.
27. Becker SO, Inchino A. Estimation of average treatment effects based on propensity scores. Stata J. 2002;2(4):358-377. http://www.stata-journal.com/sjpdf.html?articlenum=st0026
28. d'Agostino, RB, Tutorial in biostatistics: propensity score methods for bias reduction in the comparison of a treatment to a non-randomized control group. *Stat Med* 1998;17(19): 2265-2281.
29. Austin PC. An introduction to propensity score methods for reducing the effects of confounding in observational studies. Multivariate Behav Res. 2011;46(3):399-424. doi:10.1080/00273171.2011.568786
30. Rosenbaum PR, Rubin DB. Constructing a control group using multivariate matched sampling methods that incorporate the propensity score. Am Stat. 1985;39:33-38. doi:10.1080/00031305.1985.10479383
31. Leuven E, Sianesi B. PSMATCH2: Stata module to perform full malahanobis and propensity score matching, common support graphing, and covariate imbalance testing. London: University of Amsterdam and Institute for Fiscal Studies; 2003.
32. General Commission on the Status and Role of Women: The United Methodist Church. Clergy diversity proportional to membership. Retrieved from: http://www.gcsrw.org/Portals/13/SIte%20Migration/WBTN%20Link%20Fix/2014/WBN%20Feb%202014.pdf
33. Becher H, Palm F, Aigner A et al. Socioeconomic conditions in childhood, adolescence, and adulthood and the risk of ischemic stroke. Stroke. 2015;47(1):173-179.
34. Berenson GS. Childhood risk factors predict adult risk associated with subclinical cardiovascular disease: the Bogalusa heart study. Am J Cardiol. 2002;90(10C):3L-7L.
35. Nesbitt S, Victor RG. Pathogenesis of hypertension in African Americans. Congest Heart Fail. 2004;10(1):24-9.
36. Bennett GG, Wolin KY, James SA. Lifecourse socioeconomic position and weight change among Blacks: the Pitt County study. Obesity. 2007;15:172-172. doi:10.1038/oby.2007.522
37. Brondolo E, Love EE, Pencille M, Schoenthaler A, Ogedegbe A. Racism and hypertension: a review of the empirical evidence and implications for clinical practice. Am J Hypertens. 2011;24(5):518-529. doi:10.1038/ajh.2011.9
38. Wohl M, Lesser IR, Smith M. Clinical presentations of depression in African American and white outpatients. Cultural diversity and mental health. 1997;3(4):279.
39. Watson NN, Hunter CD. "I Had To Be Strong" Tensions in the Strong Black Woman Schema. Journal of Black Psychology. 2016 Oct;42(5):424-52.
40. Ferraro KF, Koch JR. Religion and health among Black and White adults: examining social support and consolation. J Sci Study Relig. 1994;33:362–375
41. Bierman A. Does religion buffer the effects of discrimination on mental health? Differing effects by race. J Sci Study Relig. 2006;45(4):551-565. doi: 10.1111/j.1468-5906.2006.00327.x
42. Krause N. Church-based social support and health in old age: exploring variations by race. J Gerontol B Psychol Sci Soc Sci. 2002;57(6):S332-47.

43. Proeschold-Bell, RJ, LeGrand, SH. High rates of obesity and chronic disease among United Methodist clergy. Obesity. 2010;18(9):1867-1870. doi: 10.1038/oby.2010.102

Table 1
Descriptive statistics for outcome variables.

Outcome variables [scale range]	Whole Sample (N=1,507) M (SD)/% (n)	African Americans (N=93) M (SD)/% (n)	Whites (N=1,414) M (SD)/% (n)	Difference in M/%	*p*
Physical Health					
Body mass index (kg/m^2)	29.6 (6.6)	31.3 (6.0)	29.5 (6.6)	1.8	.012
Physical health functioning [0-100]	52.0 (8.3)	50.1 (8.4)	52.1 (8.3)	-2.0	.026
Diabetes	21.3% (321)	35.5% (33)	20.4% (288)	15.1%	.003
Hypertension	44.7% (673)	67.7% (63)	43.1% (610)	24.6%	<.001
High cholesterol	56.7% (813)	63.6% (56)	56.2% (757)	7.4%	.394
Joint problems	34.1% (514)	40.9% (38)	33.7% (476)	7.2%	.366
Asthma	12.9% (194)	9.7% (9)	13.1% (185)	-3.4%	.637
Mental Health					
Mental health functioning [0-100]	50.2 (9.7)	54.0 (8.4)	50.0 (9.7)	4.0	<.001
Depression severity (PHQ-9) [0-27]	3.8 (4.0)	2.5 (3.2)	3.9 (4.0)	-1.4	.001
Depressive cases (PHQ-9≥10)	9.7% (146)	7.5% (7)	9.8% (139)	-2.3%	.768
Anxiety severity (HADS-A) [0-21]	4.3 (3.0)	3.7 (2.7)	4.3 (3.0)	-0.6	.053
Anxious cases (HADS-A≥8)	12.9% (194)	5.4% (5)	13.4% (189)	-8.0%	.082
Quality of life [0-100]	73.4 (11.6)	75.8 (12.1)	73.2 (11.5)	2.6	.037

Note. Means and standard deviations are reported for continuous variables; percentages and frequencies are reported for binary and categorical variables. For continuous variables, *p* values are calculated using student's t-tests; for binary and categorical variables, *p* values are caclulated using chi-squared tests. Diabetes includes pre-diabetes and borderline diabetes. High blood pressure includes pre-hypertension and borderline high blood pressure.

Table 2
Descriptive statistics for demographic, occupational and health-related variables.

Variables	Whole Sample (N=1,507) M (SD)/% (n)	African Americans (N=93) M (SD)/% (n)	Whites (N=1,414) M (SD)/% (n)	Difference in M/%	*p*
Demographic					
Female (vs male)	30.2% (455)	36.6% (34)	29.8% (421)	6.8%	.386
Age (in years)	53.4 (11.3)	58.0 (8.6)	53.1 (11.4)	4.9	<.001
Marital status					<.001
Never married	4.4% (67)	8.6% (8)	4.2% (59)	4.4%	
Married & living together	88.0% (1326)	73.1% (68)	89.0% (1258)	-15.8%	
Divorced/separated/widowed/other	7.6% (114)	18.3% (17)	6.9% (97)	11.4%	
Highest education achievement					.020
College and below	18.7% (282)	25.8% (24)	18.2% (258)	7.6%	
Master's degree	68.3% (1029)	52.7% (49)	69.3% (980)	-16.6%	
Doctoral degree	13.0% (196)	21.5% (20)	12.4% (176)	9.1%	
Gross annual income ($1,000's)	49.9 (28.1)	38.5 (25.8)	50.6 (28.0)	-12.1	<.001
Rural (vs urban) residence	31.7% (477)	25.8% (24)	32.0% (453)	-6.2%	.457
Occupational					
Retired/on leave (vs current appointment)	3.8% (58)	6.5% (6)	3.7% (52)	2.8%	.404
Time of current appointment					.143
Full-time	72.4% (1049)	60.9% (53)	73.1% (996)	-12.2%	
3/4 time	4.9% (69)!	24.4% (21)	4.9% (67%)	-0.3%	
Half-time	13.7% (199)	17.2% (15)	13.5% (184)	3.7%	
1/4 time	9.0% (130)	17.2% (15)	8.4% (115)	8.8%	
Cross-racial appointment (vs same-race)	4.9% (69)	24.4% (21)	3.6% (48)	20.8%	<.001
Hours worked per week	45.7 (14.7)	41.7 (16.3)	46.0 (14.6)	-4.3	.008
Years in ministry	18.1 (12.3)	16.4 (11.7)	18.2 (12.4)	-1.7	.190
Number of appointments served	4.1 (2.7)	3.6 (2.3)	4.1 (2.7)	-0.5	.065

Table 2 (continued)

Descriptive statistics for demographic, occupational and health-related variables

Variables	Whole Sample (N=1,507) M (SD)/% (n)	African Americans (N=93) M (SD)/% (n)	Whites (N=1,414) M (SD)/% (n)	Difference in M/%	*p*
Number of relocations due to appointment	3.3 (3.1)	2.0 (2.2)	3.4 (3.1)	-1.3	<.001
Health-related					
No health insurance (vs any insurance)	2.0% (30)	6.5% (6)	1.7% (24)	4.8%	.006
Exercise time (in mins/day)					
On vigorous activities	35.2 (40.3)	28.3 (32.7)	35.6 (40.7)	-7.3	.090
On moderate activities	41.8 (33.5)	40.3 (39.2)	41.9 (33.1)	-1.6	.657

Note. Means and standard deviations are reported for continuous variables; percentages and frequencies are reported for binary and categorical variables. For continuous variables, *p* values are calculated using student's t-tests; for binary and categorical variables, *p* values are calculated using chi-squared tests. Income includes housing allowance, estimated parsonage values, and parsonage utility budgets.

Table 3
Differences in health outcomes between Black and White clergy

	Average Difference			Matched Subsample Size		Mean Propensity Score	
Outcome variables	Coef	95% CI	*p*	Black	White	Matched Blacks	Matched Whites
Physical Health							
Body mass index	0.85	-1.13, 2.83	.400	90	78	.1556	.1373
Physical health functioning	1.40	-1.11, 3.90	.276	91	82	.1560	.1368
Diabetes	3.3%	-8.5%, 15.0%	.587	92	83	.1566	.1459
Hypertension	15.2%	2.4%, 28.0%	.020	92	83	.1566	.1459
High cholesterol	3.4%	-9.3%, 16.2%	.597	87	77	.1535	.1401
Joint problems	-1.1%	-14.1%, 11.9%	.870	92	83	.1566	.1459
Asthma	-4.3%	-14.9%, 6.2%	.421	92	83	.1566	.1459
Mental Health							
Mental health functioning	2.86	1.12, 4.59	.001	91	82	.1560	.1368
Depression severity	-1.85	-3.05, -0.64	.003	92	83	.1566	.1459
Depressive cases	-3.3%	-8.8%, 2.3%	.250	92	83	.1566	.1459
Anxiety severity	-0.34	-1.26, 0.59	.475	92	84	.1568	.1429
Anxious cases	-2.2%	-10.6%, 6.2%	.612	92	84	.1568	.1429
Quality of life	2.48	-1.51, 6.47	.223	92	83	.1566	.1459

Note. The subsample of White participants is matched with Black participants by gender, age, marital status, education, income, rural residence, employment status, vigorous exercise, moderate exercise, health insurance status, and cross-racial appointment.