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How Race, Poverty, Health Literacy, and Discrimination Affect the Relationship Between Medical Mistrust and Self-Rated Health over Time

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ABSTRACT

Mistrust of the health care system is associated with underutilization of medical services and poor self-reported health, which itself is an important indicator for future morbidity and mortality. This study examines how several factors influence the association between medical mistrust and self-rated health in a middle-aged socioeconomically diverse cohort over 16 years. Participants ($n = 1673$) from the Health Aging in Neighborhoods of Diversity over the Life Span Study formed the sample. Information was gathered on race (African American/White), sex, poverty status, health literacy, and two measures of perceived discrimination. Linear mixed model regression was used for several models to examine the independent and combined influence of these factors on how medical mistrust is related to self-rated health over time. Poverty status exhibited the greatest influence on longitudinal self-rated health. Poverty status and health literacy did not influence the association between medical mistrust and self-rated health but perceived discrimination did. Stratified analyses by race found that White participants exhibited greater influence from medical mistrust and perceived discrimination on self-rated health than African American participants. Increasing trust, improving communication, and reducing unfair treatment across vulnerable groups is likely to improve health in middle-aged adults, but reducing overall poverty is likely to have the greatest effect.

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Longitudinal; perceived discrimination; TOFHLA; unfair treatment

Introduction

Medical mistrust is a social determinant of health and health disparities.[1] While its definition can sometimes vary, medical mistrust generally refers to a "tendency to distrust medical systems and personnel believed to represent the dominant culture in a given society."[2] A person may mistrust an individual health care provider, a hospital, a health insurance plan, or other health-related institutions (e.g., clinical care research trials, pharmaceutical companies, etc.). Medical mistrust often stems from prior experiences with the health care system or society, either directly or indirectly,[3] and is associated with general underutilization of medical services including postponing care and avoiding preventative services[2,4] as well as poor self-reported health,[5] which itself is an important indicator for future morbidity and mortality.[6,7] During the COVID-19 pandemic, health care system mistrust was associated with vaccine hesitancy across racial groups, with a one unit increase in medical mistrust associated with a 16% decreased odds of vaccination.[8] Mistrust of the health care system exists at multiple levels and its consequences of mistrust extend beyond the individual patient. Importantly, addressing the sources of medical mistrust may remove obstacles to improving health outcomes.

Many structural, psychological, and sociocultural factors contribute to medical mistrust.[9] The history of repeated medical racism and violence in the US adds to skepticism and fear about all aspects of health care[10] including concern for potential for harmful experimentation in hospitals.[11]

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Race and perceived discrimination are also correlated with medical mistrust in health care, with non-Hispanic Black adults being 73% more likely to report medical mistrust than non-Hispanic White adults.[12] In the same population, perceived discrimination associated with income and type of insurance almost doubled the odds of a patient stating they didn't trust their health care provider to act in their best interest.[12] A survey of US adults found that discrimination based on race and/or ethnicity was the most common type reported in the health care system, but other factors, such as weight, education, income, and type of insurance or ability to pay, were also cited as sources of discrimination.[13] Multiple factors may be contributing to the ways in which medical mistrust yields long-term adverse effects.

Trust between provider and patient partially depends on effective communication. Health literacy is defined as the patient's ability to comprehend medical advice and instructions including numerical aspects.[14] Individuals with low health literacy tend to delay seeking medical care when needed and finding a provider.[15] Notably, one report showed that both medical mistrust and health literacy were found to have the most impact on vaccine hesitancy during the COVID-19 pandemic.[16] In some ways, low health literacy may reinforce medical mistrust. In the same study population, health literacy significantly mediated the relationship between medical mistrust and vaccine hesitancy, indicating that health literacy may be a modifiable risk factor for medical mistrust.[16] Non-White adults, people over 65 years old, adults with less than a high school education, and people living below poverty are among those at greater risk for lower health literacy.[17] Those whose identities intersect several of these categories then potentially face much more severe consequences due to the interplay of low health literacy and medical mistrust.

The examination of how medical mistrust impacts health before serious complications emerge, or even death, can be assessed through self-reported health. A simple question about current overall health status has been shown to predict future morbidity and mortality[6,7] and has demonstrated a dose-response relationship to increasing numbers of chronic conditions.[18] Changes in self-rated health in older adults remains fairly stable over time[19] and the sensitivity for predicting 5-year mortality is 95%.[20] Self-rated health is a better predictor of mortality than physicians' assessments of general health, based on data from the National Health and Nutrition Examination Survey across age, race, and sex subgroups.[21] It also provides a measure of current and near future health status independent of assessments by a health provider.

One way of potentially eliminating health disparities is to address the complex phenomenon of medical mistrust. Understanding factors associated with delay in seeking and obtaining medical care and following health care instructions is one plausible pathway of achieving health equity, as it can aid communities who are at risk for poorer health to seek treatment more frequently and readily, if accessible and available. This research will examine the association between medical mistrust and self-rated health in a middle-aged socioeconomically diverse cohort over 16 years. Furthermore, we will examine how important factors influence this relationship, specifically race, poverty, health literacy, and perceived discrimination. Understanding the factors that influence medical mistrust for a diverse middle-aged cohort can provide researchers, providers, and physicians valuable insight to improve quality health care.

Methods

Participants

Participants came from the Healthy Aging in Neighborhoods of Diversity across the Life Span (HANDLS) study, an ongoing prospective population-based longitudinal study of working-age African American and White men and women between 30 and 64 years old recruited in Baltimore, MD.[22] The first visit occurred during 2004–2009 with follow-up visits approximately every five years through 2020 for a total of four completed visits. Participants underwent a physical exam, behavioral questionnaires, medical history including health insurance status, and lab tests in a medical research vehicle in a local neighborhood. For inclusion in this study, participants needed to have data on all measures at their first visit, which resulted in 1673 study participants.

Measures

Participant demographics

Race was self-identified as African American or White and poverty status was defined as household income above or below 125% of the 2004 US Poverty Guidelines.[23] Sex was assessed as sex assigned at birth.

Medical mistrust

Medical mistrust was assessed through the seven-item version of the Medical Mistrust Index which has been previously validated.[4] Questions asked about agreement with statements regarding health care providers on a four-point Likert scale from 1 (strongly disagree) to 4 (strongly agree), such as, "Patients have sometimes been deceived or misled by healthcare organizations." Scores were averaged across the seven questions with higher values indicating more mistrust. Medical mistrust showed good inter-item reliability in the HANDLS cohort (Cronbach's alpha = 0.74).

Self-rated health

Self-rated health status was measured using the key question from the 12-Item Short Form Health Survey[24] with possible responses for quality of overall health: poor, fair, good, very good, and excellent. Responses were combined it into two categories for analysis; poor health for responses poor and fair, and the remaining responses indicating good health. After the first visit, self-rated health was also assessed at each follow-up visit; visit 2 (2009–2013), visit 3 (2013–2017), and visit 4 (2017–2020). Participants had an average of 3.07 self-rated health ratings (range 1–4, standard deviation 0.85) over an average of 9.47 years (range 0–15.28, standard deviation 3.46).

Perceived discrimination

Perceived discrimination was measured using two questionnaires previously assessed for HANDLS participant:[25] sources of discrimination (modified from[26]) and experiences of discrimination.[27] Sources of discrimination is a ten-item questionnaire on a four-point Likert scale ranging from 1 (not at all) to 4 (a lot). Questions ask "Overall, how much have you experienced prejudice or discrimination because of…" sex, race, ethnicity, income, age, physical appearance, religion, health status, and disability. Scores were summed and totals range from 10 to 40 with higher scores indicating more types of discrimination experienced more frequently. Sources of discrimination showed good inter-item reliability in the HANDLS cohort (Cronbach's alpha = 0.85). Everyday discrimination is a nine-item questionnaire on a six-point Likert scale ranging from 1 (almost every day) to 6 (never). Questions ask about the frequency of unfair treatment without attribution to race or sex, e.g., "How often do people act as if they are afraid of you?" Scores are summed and totals range from 9 to 54 with higher scores indicating greater discrimination. Everyday discrimination showed good inter-item reliability in the HANDLS cohort (Cronbach's alpha = 0.84). Scores from both discrimination scales were positively skewed and log base 2 transformed for use in the regression models so that a 1-unit increase in the transformed variable corresponded to a doubling in the original scale.

Health literacy

Health literacy was measured using the Test of Functional Health Literacy in Adults (TOFHLA) short form.[14] The TOFHLA assesses comprehension of health-related materials, such as instructions about medication timing and dosage. Scores range from 0 to 100 indicating inadequate (0–53), marginal (54–66), or adequate (67–100) health literacy.

Data analysis

All data management and analyses were performed in R version 4.4.[28] Bivariate comparisons between race groups were done using chi-squared tests for categorical variables and Student's *t*-test for continuous variables. A Student's *t*-test was used to test the medical mistrust scores *versus* a possible middle score of 2.5. Pearson's correlation test was used for assessing the correlation between perceived discrimination

questionnaires. We examined several logistic mixed effects regression models to elucidate the relationship between odds of poor self-rated health over time and medical mistrust using the R package lme4. The base model examined the odds of having poor self-rated health due to medical mistrust, sex, age, and health insurance. Additional separate models examined how other variables explained this relationship; Model 1: base model plus race and poverty status, Model 2: base model plus health literacy, Model 3: base model plus two measures of perceived discrimination, and Model 4: all variables. Odds ratios (OR) and 95% confidence intervals (CI) are reported for each variable. After the initial models, sensitivity analyses were performed to further understand the dynamics among race, poverty status, and medical mistrust in relation to self-rated health. The first examined interactions starting with the three-way interaction among race, poverty status, and medical mistrust using backward elimination to remove non-significant interactions. The second examined if the association between medical mistrust and self-rated health differed over time. Elapsed time in decimal years from first visit in HANDLS was calculated for each person at each time point. Models for this sensitivity analysis included age at enrollment, time, and the interaction of medical mistrust and time. ORs for the interaction terms were calculated using the package emmeans.[29] Statistical significance was defined as a p-value < 0.05.

Results

There were 1673 people who had data for this study from HANDLS (Table 1). Most of these participants were women (59%), African American (62%), and living above poverty (62%). Study participants were between 30 and 65 years of age at their first mobile research vehicle visit (mean 48 years) and the majority had health insurance (69%) and tested as having adequate health literacy (83%). African American and White adults in the study did not differ based on sex, age or self-rated health. However, African American adults reported higher levels of perceived discrimination ($p < 0.01$), were less likely to have health insurance ($p < 0.01$), and were less likely to have adequate health literacy ($p = 0.02$) than White adults in the study. Race and poverty status were highly correlated in this study sample ($p < 0.001$), with 29% of White adults and 44% of African American adults living below poverty. Overall, participants had a mean medical mistrust score of 2.6, significantly greater than the middle possible score of 2.5 ($p < 0.001$) indicating a slight overall agreement with the presence of medical mistrust. African American participants had a higher medical mistrust score than White participants ($p < 0.001$). There was no significant difference in medical mistrust score between those above and below poverty ($p = 0.82$). In a breakdown by race and self-rated health category, White participants with good self-rated health had the lowest mean medical mistrust score of 2.6 (standard

Table 1. Demographic description of the cohort study sample at first visit ($N = 1673$).

Variable	Overall	White	African American	p-Value*
Sample size	1673	639	1034	
Age, mean (*SD*)	48.28 (9.06)	48.68 (9.10)	48.03 (9.03)	0.15
Sex, *n* (%)				0.93
Men	693 (41.4)	266 (41.6)	427 (41.3)	
Women	980 (58.6)	373 (58.4)	607 (58.7)	
Poverty status, *n* (%)				<0.001
Above	1030 (61.6)	453 (70.9)	577 (55.8)	
Below	643 (38.4)	186 (29.1)	457 (44.2)	
Medical mistrust, mean (*SD*)	2.63 (0.43)	2.58 (0.44)	2.66 (0.42)	<0.001
Self-rated health, *n* (%)				0.51
Good	1278 (76.4)	482 (75.4)	796 (77.0)	
Poor	395 (23.6)	157 (24.6)	238 (23.0)	
Sources of discrimination, mean (*SD*)	16.41 (5.77)	14.42 (4.63)	17.63 (6.06)	<0.001
Experiences of discrimination, mean (*SD*)	20.55 (8.32)	19.68 (7.90)	21.09 (8.53)	<0.01
Health insurance, *n* (%)				<0.01
Yes	1147 (68.6)	469 (73.4)	678 (65.6)	
No	526 (31.4)	170 (26.6)	356 (34.4)	
Health literacy level (TOFHLA), *n* (%)				0.02
Inadequate	153 (9.1)	52 (8.1)	101 (9.8)	
Marginal	132 (7.9)	37 (5.8)	95 (9.2)	
Adequate	1388 (83.0)	550 (86.1)	838 (81.0)	

TOFHLA: Test of Functional Health Literacy in Adults.
*Differences between racial groups were tested using Student's t-test for continuous variables and chi-squared test for categorical variables.

deviation 0.4) and those with poor self-rated health had a mean score of 2.7 (0.5). African American participants had higher mean scores for both those with good (2.7 (0.4)) and poor (2.7 (0.5)) self-rated health. Sources and experiences of discrimination questionnaires were significantly but moderately correlated ($r = 0.45$, $p < 0.001$) indicating that these measures cover related, but separate, aspects of perceived discrimination. The majority of participants rated their health as good at visit 1 (76%), as well as subsequent visits with 73% of all responses being good.

The base model (Table 2) included the covariates of sex, age, and health insurance. Higher medical mistrust scores and age were associated with an increased odds of reporting poor self-rated health. A one-category increase in medical mistrust score (e.g., agree to strongly agree) was associated with a 74% increased odds of poor self-rated health. In Model 1, poverty status was related to poor self-rated health over time but race was not. Participants living below poverty status were more than twice as likely to report poor self-rated health as those living above poverty status (OR: 2.65, 95% CI: 2.00, 3.52). The association between medical mistrust and poor self-rated health was not substantially altered; an increase in medical mistrust score of 1 corresponded to a 77% (OR: 1.77, 95%CI: 1.30, 2.42) increased odds of having poor self-reported health in this model. Model 2 comprised the base model with health literacy. Adults who had inadequate or marginal health literacy (not adequate) were 94% (OR: 1.94, 95%CI: 1.37, 2.76) more likely to have poor self-reported health. Medical mistrust remained significantly related to poor self-rated health in this model to a similar degree (OR: 1.71, 95%CI: 1.25, 2.34). Model 3 comprised the base model with the two measures of perceived discrimination, both log base 2 transformed for analysis. Experiences of discrimination, representing everyday unfair treatment, was significantly related to self-rated health with a doubling of questionnaire score (e.g., 15 to 30) corresponding to a 50% increase in odds of poor self-reported health (OR: 1.50, 95%CI: 1.15, 1.96). Sources of discrimination, a summary of types of discrimination, was not significantly related to self-rated health ($p = 0.20$) in this model. The relationship between medical mistrust and self-rated health was attenuated in this model to marginally significant ($p = 0.05$) indicating that the relationship could be partially accounted for by the inclusion of the perceived discrimination variables. Model 4 included the base model and all variables considered. Similar to previous models where variables were considered separately, living below poverty status (OR: 2.44, 95%CI: 1.84, 3.24) and having inadequate health literacy (OR: 1.79, 95%CI: 1.26, 2.53) were significantly related to poor self-rated health. The inclusion of perceived discrimination corresponded to an attenuated, but significant, relationship between medical mistrust and longitudinal self-rated health (OR: 1.41, 95%CI: 1.02, 1.96) compared to models without perceived discrimination. In model 4, experiences of discrimination was significantly related to poor self-rated health (OR:1.42, 95%CI: 1.09, 1.85) while sources of discrimination was not ($p = 0.11$). Higher age was significantly related to increased odds of poor self-rated health in all models, and race was not significant in models 1 and 4.

The sensitivity analysis examining the interactions among race, poverty status, and medical mistrust in the full model (Model 4) did not result in a significant three-way interaction ($p = 0.35$). Backwards elimination based on coefficient p-value resulted in one significant two-way interaction between medical mistrust and race ($p = 0.02$). The other main effects which were significant in Model 4 (i.e., age, health literacy, and experiences of discrimination) remained significant. Given this significant interaction with race, we performed a stratified analysis on Model 4 (Table 3).

Table 2. Odds ratios and 95% confidence intervals for poor self-rated health over time from logistic mixed model regression ($N = 1673$).

Variables	Base	Model 1	Model 2	Model 3	Model 4
Medical mistrust	**1.74 (1.27, 2.38)**	**1.77 (1.30, 2.42)**	**1.71 (1.25, 2.34)**	1.39 (1.00, 1.94)	**1.41 (1.02, 1.96)**
Sex (male)	**0.74 (0.56, 0.97)**	0.80 (0.61, 1.05)	**0.74 (0.56, 0.97)**	**0.70 (0.53, 0.92)**	**0.75 (0.57, 0.98)**
Age (decades)	**1.59 (1.41, 1.81)**	**1.61 (1.42, 1.82)**	**1.57 (1.39, 1.78)**	**1.64 (1.44, 1.86)**	**1.62 (1.43, 1.83)**
Health insurance (yes)	0.87 (0.65, 1.16)	1.03 (0.77, 1.38)	0.87 (0.65, 1.16)	0.88 (0.66, 1.17)	1.02 (0.77, 1.36)
Poverty status (below)	–	**2.65 (2.00, 3.52)**	–	–	**2.44 (1.84, 3.24)**
Race (African American)	–	0.85 (0.65, 1.12)	–	–	0.77 (0.58, 1.02)
Health literacy (not adequate)	–	–	**1.94 (1.37, 2.76)**	–	**1.79 (1.26, 2.53)**
Sources of discrimination ($\log_2$)	–	–	–	1.24 (0.90, 1.72)	1.32 (0.94, 1.84)
Experiences of discrimination ($\log_2$)	–	–	–	**1.50 (1.15, 1.96)**	**1.42 (1.09,1.85)**

Numbers in bold are statistically significant at $p < 0.05$.

Table 3. Odds ratios and 95% confidence intervals for poor self-rated health over time from logistic mixed model regression stratified by race.

Variables	African American	White
Medical mistrust	1.16 (0.78, 1.72)	**1.78 (1.01, 3.12)**
Sex (male)	**0.68 (0.49, 0.95)**	0.97 (0.60, 1.56)
Age (decades)	**1.69 (1.45, 1.97)**	**1.50 (1.21, 1.86)**
Health insurance (yes)	1.06 (0.75, 1.50)	0.91 (0.54, 1.56)
Poverty status (below)	**2.13 (1.53, 2.96)**	**3.17 (1.88, 5.34)**
Health literacy (not adequate)	1.47 (0.98, 2.20)	**2.83 (1.46, 5.47)**
Sources of discrimination ($\log_2$)	1.01 (0.68, 1.51)	**2.64 (1.41, 4.95)**
Experiences of discrimination ($\log_2$)	1.28 (0.93, 1.77)	**1.73 (1.09, 2.75)**

Numbers in bold are statistically significant at $p < 0.05$.

For the White participants, age, living below poverty status, inadequate health literacy, and both measures of perceived discrimination were associated with an increased risk of poor self-rated health over time. The inclusion and significance of these variables did not alter the association between medical mistrust and self-rated health, which was similar to that observed in the base model for the full study sample (OR: 1.78, 95%CI: 1.01, 3.12). While perceived discrimination was associated with poor self-rated health for the White participants, it did not account for the association between medical mistrust and self-rated health. In the stratified analysis for the African American participants, age, female sex, and living below poverty status were the only variables significantly associated with poor self-rated health in this longitudinal study (Table 3). Medical mistrust was attenuated to the point of being not significant ($p = 0.48$). Health literacy and perceived discrimination were not significantly related to poor self-rated health over time for the African American adults in the study. To ensure that this non-significant result was not a by-product of several insignificant terms in the model, we also ran a model for this race group with only medical mistrust, sex, age, and poverty status. Medical mistrust was still not significantly related to self-rated health ($p = 0.20$).

The sensitivity analysis examining if the association between medical mistrust and self-rated health varied over time was assessed through the interaction of medical mistrust and time. For each model (Base, 1–4), the interaction of medical mistrust and time was not significant (p-values from 0.93 to 0.98).

Discussion

This study explored the association between medical mistrust and self-rated health across 16 years in a middle-aged to elderly socioeconomically diverse cohort and examined how race, poverty status, health literacy, and perceived discrimination influenced this association. Overall, while poverty status and health literacy do not influence the association between medical mistrust and self-rated health, perceived discrimination does. Furthermore, race differences emerged, such that White participants exhibited greater influence from medical mistrust and perceived discrimination on self-rated health than African American participants did.

The association of medical mistrust with self-rated health was affirmed. Previous studies found a significant relationship between medical mistrust and concurrent self-rated health,[5,12] but the current study is novel in examining self-rated health over time. This study revealed that a one-category increase in medical mistrust score (e.g., agree to strongly agree) was associated with a 74% increased odds for poor self-rated health after accounting for age and sex. This finding demonstrates the potential impact of medical mistrust on health outcomes over time, given the association of self-rated health with mortality, especially over 5–10 years.[20]

Poverty status, living above or below 125% of the federal household poverty line, had the strongest association with self-rated health and did not alter the association between medical mistrust and self-rated health. Poverty is linked to poor health through reduced access to resources that provide for a healthy life, such as secure food access,[30] safe neighborhoods, and educational and employment opportunities.[31] Research has shown that what may appear to be racial differences in mortality rates in Medicare beneficiaries can be accounted for by differences in poverty.[32] In the current study and in previous work examining medical mistrust,[5,12] income and poverty status were not significantly related to medical mistrust. The current findings suggest that poverty status and medical mistrust are independently associated with self-rated health over time.

A lack of adequate health literacy almost doubled the risk for poor self-rated health *versus* adequate health literacy in this study sample. While health literacy has been previously associated with medical mistrust[33] and self-rated health,[17] we showed that health literacy level did not alter the association between medical mistrust and self-rated health. This study used the TOFHLA, rather than self-assessment, to objectively assess understanding of medical instructions including numerical information. This assessment cannot differentiate among several areas which contribute to health literacy: reading ability, lack of health or biology knowledge, lack of language knowledge, and cultural differences in views of health.[34] Although health literacy is established as an important determinant of health and a potentially modifiable risk factor, there has been a lack of studies examining interventions.[35] While independent of medical mistrust, this study reaffirmed that health literacy is an important factor in self-rated health over time.

Perceived discrimination, as assessed by everyday experiences of unfair treatment, was associated with an increased risk of poor self-rated health both independently and adjusted for other variables in the model for the study sample. Although perceived discrimination is a broad term,[25] there are multiple personal attributes which may be referenced when someone chooses to engage in discriminatory behavior (e.g., race, age, sex, religious affiliation, and weight). The two scales used in this study do not singularly focus on racially based discrimination. Although African American participants had a higher average score on both perceived discrimination scales than White participants, both groups reported experiencing discrimination or unfair treatment. The inclusion of the perceived discrimination scales resulted in an attenuated relationship between medical mistrust and self-rated health with an estimated odds ratio 30% less than in models without them. This result implies that perceived discrimination explains some of the association between medical mistrust and self-rated health rather than it having an independent association. The significance of experiences of discrimination, but not sources of discrimination, further elucidates what aspects of discrimination were important in this cohort. The frequency of "chronic, routine, and relatively minor experiences of unfair treatment,"[27] rather than how an individual appraises the source of discrimination, might have a unique influence on self-rated health and medical mistrust.

Race was not significantly associated with self-rated health in the study sample overall, but there was a significant interaction between race and medical mistrust indicating a more complex relationship. Race-stratified analyses revealed that for African American participants, neither medical mistrust, health literacy, nor perceived discrimination were significantly related to self-rated health. Health literacy has been found to be significant mediator between race and health outcomes, but may not explain within race differences.[36] Meta analysis has demonstrated perceived discrimination negatively affected engagement in healthy behaviors, but there lacked evidence linking perceived discrimination with (nonfatal) physical health outcomes, such as self-rated health.[37] The lack of association between medical mistrust and self-rated health over time within this subset is surprising. Medical mistrust has been found to be higher in non-Hispanic Black adults compared with non-Hispanic White adults[12] and this is supported by the current analysis. The level of medical mistrust reported in the African American subset of the study sample is significantly higher than for White participants.

For the White participants, medical mistrust was related to an increased odds of poor self-rated health over time. Living below poverty status and lacking adequate health literacy also increased odds of having poor self-rated health. For perceived discrimination, both measures were significantly related to an increased odds of poor self-rated health. This finding of perceived discrimination being related to poor health for White participants is not novel. Barnes, de Leon, Lewis, Bienias, Wilson, and Evans[38] found that perceived discrimination due to unfair treatment was associated with mortality for the entire sample, but upon examining an interaction by race, the results showed a significant increased mortality risk only for the White participants. These same authors suggested that among older African American adults, having a lifetime of potential experiences with discrimination may have engendered coping strategies to more effectively handle their harmful effects.[38] Although this might conflict with the *weathering hypothesis*, which proposes that cumulative chronic stress for African American adults, especially women, leads to an earlier onset of physiological problems,[39] this study still supports that the attribution of discrimination may also play a factor. Mouzon, Taylor, Woodward, and Chatters[40] found that racial, but not nonracial, discrimination was associated with physical health outcomes for a sample of African American adults.

This study adds to the existing literature in this area in several ways. While links between perceived discrimination and health have been weak, this study demonstrates that it plays a role in how medical mistrust is related to self-rated health. Also, examining perceived discrimination through two different scales showed how the perception of daily unfair treatment as measured by the experiences of perceived discrimination may be related to self-rated health especially in populations who do not have a history of structural disenfranchisement. Finally, poverty status had the most impact on the odds of poor self-rated health and while a large and complex issue, reducing the number of people living in poverty has the potential to have the greatest impact on improving health on people the in US.

This study has several limitations. The study sample is a subset of the HANDLS cohort, which is limited to residents from Baltimore, Maryland and may not be representative of middle-aged adults living in other areas, especially those in suburban or rural communities. Independent demographic analyses found that the HANDLS cohort is representative of urban populations from U.S. cities with similar population densities and racial distribution, namely, Atlanta, GA; Bridgeport, CT; Bridgeton, NJ, Buffalo, NY; Camden, NJ; Carson, CA; Chicago, IL; Cleveland, OH; Detroit, MI; Harrisburg, PA; Hartford, CT; Oakland, CA; Springfield, MS; and Trenton, NJ.[41] While the measurements used to define medical mistrust, health literacy, self-rated health and perceived discrimination are validated instruments, they all represent a limited aspect of each construct. Besides self-rated health, the other variables were assessed at one time point. Poverty status included only household income and lacked important aspects of wealth, such as home ownership.

Future research would benefit from examining the extent to which all forms of discrimination reduce lifetime healthcare utilization, especially for screening tests, eye exams, and dental care. This is especially important for reducing health disparities in delayed or late-stage diagnoses of chronic conditions, such as cardiovascular disease, cerebrovascular disease, kidney disease, and cancer. Although a handful of studies have approached these topics,[12,42] none have examined the trajectories of lifetime healthcare utilization or whether conditions have improved due to available resources, such as the Affordable Care Act. In addition, intervention research should examine the efficacy of efforts to ameliorate the influence of discrimination on medical mistrust given that current research has found implicit bias training for health care providers to be lacking in both reliability and validity.[43]

Conclusions

This study found an association between medical mistrust and self-rated health across 16 years in a middle-aged to elderly socioeconomically diverse cohort. Furthermore, while poverty status exhibited the greatest influence on longitudinal self-rated health, poverty status and health literacy did not influence the association between medical mistrust and self-rated health but perceived discrimination did. Stratified analyses by race found that White participants exhibited greater influence from medical mistrust and perceived discrimination on self-rated health than African American participants. Increasing trust, improving communication, and reducing unfair treatment across vulnerable groups is likely to improve health in middle-aged adults, but reducing overall poverty is likely to have the greatest effect.

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Ethical approval

Each participant provided written informed consent at enrollment and each subsequent visit. The study was approved by the National Institutes of Health Institutional Review Board (Protocol #09AGN248). Participants received financial compensation for their time.

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Data availability statement

Data are available to researchers after approval of a research proposal and after they have agreed to confidentiality as required by the National Institutes of Health Institutional Review Board. Policies and forms are available at: https://handls.nih.gov.

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