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# Combined Effects of Race and Educational Attainment on Physician Visits Over 24 Years in a National Sample of Middle-Aged and Older Americans

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## Abstract

**Background:** The literature on Minorities' Diminished Returns (MDRs) have shown worse than expected health of the members of racial and ethnic minority groups particularly Blacks. Theoretically, this effect can be in part due to weaker effects of educational attainment on preventive care and disease management in highly educated racial and ethnic minorities.

**Objectives:** The current study explored the racial and ethnic differences in the effect of baseline educational attainment on % adherance to the routine physician visits among middle-aged and older adults in the US.

**Methods:** This is a prospective study with 24 years of follow up. The Health and Retirement Study (HRS: 1992-2016) included 10 880 middle-aged and older adults who were Hispanic, non-Hispanic, Black or White. The independent variable was educational attainment. The dependent variable was adherance to the routine physician visits (%). Age, gender, marital status, income, health behaviors (smoking and drinking) and health (depression, self-rated health, and chronic diseases) were the covariates. Race and ethnicity were the focal moderators. Linear regression was used for data analysis.

**Results:** Overall, higher educational attainment was associated with higher % of adherance to the routine physician visits over the course of follow-up, net of all confounders. Race showed a significant statistical interaction with educational attainment suggesting of a smaller effect of high education attainment on % adherance to the routine physician visits for Black than White middle-aged and older adults. A similar interaction could not be found for the comparison of Hispanic and non-Hispanic middle-aged and older adults.

**Conclusion:** Educational attainment is associated with a larger increase in preventive and disease management doctor visits for White than Black middle-aged and older adults. This is a missed opportunity to improve the health of highly educated middle-aged and older adults. It is not race/ethnicity or class that shapes health behaviors but race/ethnicity and class that shape people's pro-health behaviors. At least some of the racial health disparities is not due to low SES but diminished returns of SES.

**Keywords:** Minority Group, Minority Health, Ethnic Groups, Socioeconomic Status, Socioeconomic Factor, Educational Attainment, Health Services Accessibility

## 1. Background

Due to the existing Minorities' Diminished Returns (MDRs), health of middle class Blacks and Hispanics suffer.[1,2] This is in part due to the systemically weaker health effects of socioeconomic status (SES), particularly educational attainment, on the health and well-being of racial and ethnic minority groups relative to Whites.[1,2] In the U.S. context, educational attainment,[3] income,[4] employment,[5] and marital status [6] generate more tangible health outcomes for Whites than Blacks.

The MDRs are well-established for a wide range of health outcomes such as depression,[7] anxiety,[6] and self-rated mental health.[8] MDRs are also documented for physical health outcomes such as obesity,[9] asthma,[4] attention-deficit/hyperactivity disorder (ADHD)[10] hypertension,[11] chronic obstructive pulmonary disease (COPD)[12], number of chronic diseases,[4] self-rated physical health,[8] hospitalization,[13] and mortality.[14]

Research has proposed several potential mechanisms for such a phenomenon. MDRS are partially attributed to economic mechanisms such as labor market discrimination.[1,2,15,16] This is because multiple studies have shown that highly educated Black families remain at a high risk of poverty.[17] Other studies have attributed MDRs to interpersonal discrimination.[18-20] Finally, some research evidence suggests that highly educated Blacks are experiencing high levels of environmental stress and exposure to toxins.[21]

It has been suggested that highly educated Blacks and Hispanics are at a higher risk of poor health behaviors.[22-28] For example, highly educated Blacks have a worse diet than highly educated Whites.[22] In addition, highly educated

Blacks have a lower tendency to exercise than highly educated Whites.[23] Similarly, highly educated Blacks and Hispanics are more likely to smoke and binge drink.[26] Two recent studies have suggested that poor preventive health seeking behaviors may be another mechanism for such a difference, as highly educated Blacks report less than expected usage of oral[29] and breast exams.[30] Still we are not aware of any previous research on MDRs of educational attainment on adherence to the routine physician visits across race and ethnic groups among middle-aged and older adults.

## 2. Objectives

This study aimed to investigate the MDRs of educational attainment on the % adherence to routine physician visits among Black and Hispanic middle-aged and older American adults. We compared race/ethnic groups of middle-aged and older adults for the effects of baseline education with the % adherence to routine physician visits over time. In line with the MDRs theory,[1,2] we expected weaker effects of baseline educational attainment on future % adherence to routine physician visits for Black and Hispanic middle-aged and older adults in comparison to their non-Hispanic White counterparts. In other terms, we expected a larger proportion of highly educated Black and Hispanic middle-aged and older adults still to report poor adherence to routine physician visits, compared to their highly educated White counterparts.

## 3. Methods

### 3.1. Design and Setting

This is a prospective study with 24 years of follow up. Data came from all waves (n = 13) of the Health and Retirement Study (HRS), 1992 to 2016. The HRS, a state-of-the-art long-term longitudinal study, has conducted biannual observations of a nationally representative sample of American middle-aged and older adults over the age of 50. Although more information on methodology, study design, measures, sample, and sampling of the HRS is available elsewhere,[31] we provide a summary of the key features of the study here.

### 3.2. Participants and Sampling

This study only included the core primary sample of the HRS that were recruited in 1992. Participants were born between 1931 and 1941. The HRS sampling strategy was a national area probability sample of all US households in 1992 (Wave 1).

### 3.3. Analytical Sample

The current study included individuals who were 50+ years old and self-identified as White/Caucasian or Black/African American. Both Hispanic and non-Hispanic people were enrolled in our analysis. This sample included 10 880 participants. Every participant who entered the HRS was included in our analysis regardless of the duration of follow up, because we had data on % adherence to routine physician visits over time from all participants, regardless of drop out from this study.

### 3.4. Data Collection

HRS study collected extensive data on various aspects of the participants. These data included demographic, SES, social, psychological, behavioral, health service use and health information. Although data were collected from participants and their spouses, we only included the participants' data. Data were collected on a biannual basis, which were included to this study (1992 to 2016 = wave 1 to wave 13). The HRS data collection was either through standard questionnaires that were completed wither in a telephone or a face-to-face interview. For the individuals who were not available, proxy interviews were used (controlled in this study as a covariate).

### 3.5. Measures

*Demographic Factors.* Age and gender were the study demographic factors. Age was a continuous measure (recorded in years passed since birth). Gender was a dichotomous variable, coded as male =1, female =0. Age and gender were both measured at 1992.

*Educational attainment.* Educational attainment was the primary SES indicator of interest (independent variable). Educational attainment was a continuous measure recorded in years of schooling and was measured at baseline (1992).

*Income.* Income was the SES covariate (confounder). Income was a continuous variable in USD, measured at baseline (1992).

*Depressive symptoms.* The eight item Center for Epidemiologic Studies Depression scale (CES-D) was used to measure depressive symptoms. The CES-D scale is a reliable and validated measure of level of depressive symptomatology over the past week.[32-34] We used the first CES-D score which was due to the year 1994, with a higher score indicating more depressive symptomatology.

*Self-rated health (SRH).* Conventional single item measure of SRH was used. Participants reported their health was excellent, very good, good, fair, or poor. SRH was operationalized as a continuous variable ranging from 1 to 5, with a higher score indicating worse health. Research has repeatedly demonstrated high validity and reliability of SRH as a predictor of mortality risk.[35] We used the bassline SRH measured at 1992.

*Chronic Medical Conditions (CMCs).* A variable was used that reflected the number (count) of various chronic medical conditions including diabetes mellitus, heart disease, emphysema/asthma, stroke, cancer, hypertension, arthritis, and psychiatric conditions. Participants were asked if a doctor has ever told them that they have any of these conditions. This variable had a range of 0 to 8, with a higher score reflecting multimorbidity.

### 3.6. Data Analysis

We analyzed the HRS data using SPSS 23.0 (IBM Corporation, Armonk, NY, US). We used Taylor series

estimation to calculate the variance of our study variables using the HRS survey weight due to clustering, stratification, and non-response. As a result of applying the HRS weights, our result presented is are generalizable to the US general population of middle-aged and older adults (age ≥ 50) at 1992. For our univariate analyses, we reported means (SD) as well as frequencies (%). For multivariable analysis, we applied linear regressions with % adherence to the routine physician visits over time as the outcome. We ruled out the multi-collinearity between race, ethnicity, educational attainment, and covariates. We also tested the distribution of our outcome as well as distribution of error terms of our linear regression models. We did not find evidence against application of linear regression models. We did not have missing data simply because two waves were enough for the definition of our smoking trajectories. We ran three series of logistic regression models without (*Model 1*) and with (*Model 2*) our two statistical interaction terms between race, ethnicity, and SES indicators (educational attainment).

## 4. Results

### 4.1. Descriptive Statistics

This study included 10 880 American adults who were either non-Hispanic, Hispanic, White, or Black. Table 1 shows descriptive statistics of the overall sample. On average, participants had 90% adherence to routine physician visits over time (Table 1).

### 4.2. Multivariable Models

Table 2 presents the summary of the results of two linear regression models with educational attainment as the predictor/independent variable and % adherence to the routine physician visits over time as the outcome/dependent variable. Both these models were estimated in the overall sample with the following difference: *Model 1* only entered the main effects. *Model 2*, however, also added two interaction terms between race and ethnicity with educational attainment.

Based on *Model 1*, high educational attainment at baseline (wave 1) was associated with higher % adherence to routine physician visits over time (during the 26 years of follow up). *Model 2* revealed an interaction between race and educational attainment on % adherence to routine physician visits over time. This interaction suggested that the effect of high educational attainment on increasing % adherence to routine physician visits over time was smaller for Blacks than whites (Table 2).

**Table 1.** Descriptive Statistics in the Overall Sample (n=10 880)

| | All | |
|---|---|---|
| | **No.** | **%** |
| Race | | |
| White | 8982 | 82.6 |
| Black | 1898 | 17.4 |
| Ethnicity | | |
| Non-Hispanic | 10018 | 92.1 |
| Hispanic | 854 | 7.9 |
| Gender | | |
| Women | 5384 | 49.5 |
| Men | 5496 | 50.5 |
| Partnered | | |
| Yes | 10605 | 97.5 |
| No | 275 | 2.5 |
| | **Mean** | **SD** |
| Age (y) | 56.47 | 4.48 |
| Education (y) | 12.03 | 3.21 |
| Income (USD 1000) | 46.84 | 50.77 |
| Depressive symptoms | 1.30 | 1.97 |
| SRH | 2.61 | 1.21 |
| Chronic medical conditions | 1.10 | 1.14 |
| % Adherence to the routine physician visits over time | 0.90 | 0.19 |

SD: standard deviation, SRH, self-rated health; CI: confidence interval.

## 5. Discussion

This study showed a weaker effect of educational attainment on % adherence to routine physician visits in black than White middle-aged and older adults. We did not find similar difference in the effects of education on adherence to routine physician visits between Hispanic and non-Hispanic middle-aged and older adults.

This is a successful documentation of MDRs of educational attainment for % adherence to routine physician visits among Black middle-aged and older adults. These findings are in line with the MDRs literature across health domains and SES indicators.[1,2] The current finding extends the MDRs to a new outcome and new age group and suggests that poor health care use and low preventive care and disease management may be a mechanism by which high SES Blacks show worse than expected heath status. Previous research has shown that health disparities remain at all SES levels suggesting that education is not a real equalizer.[36,37] For example, as shown by the work by Zajacova et al[36,37] and others,[38-40] education does not similarly improve the health of Blacks and Whites. We have shown that this is always the case for almost all outcomes. Education seldom has a similar effect across racial and ethnic groups, and Hispanic and Black people almost always tend to stay in a relative disadvantage compared to non-Hispanic Whites.[1,2]

Multiple mechanisms are listed as possible cause of MDRs. One is psychological. High SES Blacks experience more not less discrimination.[41-45] Similarly, high SES Blacks are more vulnerable, not more resilient, to discrimination.[46] This is in part because high SES Blacks are more likely to live closer to Whites, which increases their cross-racial interactions and encounters.[41-45] We already know that discrimination impairs the gains that is expected to follow education for Blacks.[3,27,29,45,47-49]

Another mechanism for the MDRs are lower effects of educational attainment on income and economic wellbeing of Black individuals.[16] Research has shown that highly educated Blacks tend to have worse jobs,[21] experience more stress,[50] and have a higher likelihood of poverty.[17] That means, education does not have the same effect on changing

**Table 2.** Summary of Linear Regression on the Effect of Education and Income on % Adherence to the Routine Physician Visits Over the Follow up Period

| | Model 1 (All, Main Effects) | | | | | Model 2 (All, Main Effects + Interactions) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | b | SE | 95% CI for b | | P | b | SE | 95% CI for b | | P |
| Age (y) | 0.00 | 0.00 | 0.00 | 0.00 | 0.032 | 0.00 | 0.00 | 0.00 | 0.00 | 0.038 |
| Race (Black) | 0.00 | 0.00 | -0.01 | 0.01 | 0.506 | 0.03 | 0.02 | 0.00 | 0.06 | 0.085 |
| Ethnicity (Hispanic) | -0.03 | 0.01 | -0.05 | -0.02 | <0.001 | -0.03 | 0.02 | -0.06 | 0.00 | 0.056 |
| Gender (Male) | -0.03 | 0.00 | -0.04 | -0.03 | <0.001 | -0.04 | 0.00 | -0.04 | -0.03 | <0.001 |
| Education (y) (1992) | 0.01 | 0.00 | 0.01 | 0.01 | <0.001 | 0.01 | 0.00 | 0.01 | 0.01 | <0.001 |
| Partnered (1992) | -0.02 | 0.01 | -0.04 | 0.01 | 0.162 | -0.02 | 0.01 | -0.04 | 0.01 | 0.146 |
| Income | 0.01 | 0.00 | 0.00 | 0.01 | <0.001 | 0.01 | 0.00 | 0.00 | 0.01 | <0.001 |
| Depressive symptoms | 0.00 | 0.00 | 0.00 | 0.00 | 0.198 | 0.00 | 0.00 | 0.00 | 0.00 | 0.225 |
| Self-rated health | 0.01 | 0.00 | 0.01 | 0.02 | <0.001 | 0.01 | 0.00 | 0.01 | 0.02 | <0.001 |
| Chronic Medical Conditions | 0.03 | 0.00 | 0.03 | 0.04 | <0.001 | 0.03 | 0.00 | 0.03 | 0.04 | <0.001 |
| Education × Race (Black) | | | | | | 0.00 | 0.00 | -0.01 | 0.00 | 0.048 |
| Education × Ethnicity (Hispanic) | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.945 |

SE: standard error, CI: confidence interval.

the living conditions of Blacks and Whites.[17] Thus, highly educated Blacks do not enjoy the same expected effects of educations as their White counterparts do.

A growing literature has shown a larger magnitude of the effects of educational attainment and other SES indicators on smoking,[27] drinking,[26,51] diet,[22] and impulsivity[52] for ethnic minorities than the mainstream population. Similarly, MDRs are shown for obesity,[9] chronic disease,[4] self-rated health,[8] happiness,[16] depression,[7] suicide.[53] Thus, MDRs are a systemic cause of poor health of high SES Whites and Blacks.

Lower than expected effects of educational level on pro-health behaviors in racial and ethnic minorities may be due to various mechanisms. One may be lower education quality of Blacks than Whites.[14] Scarcity of educational resources in urban and inner-city schools where most Black individuals to school may lower the effect of education on various outcomes for Blacks. As such, reducing the inequalities in schooling quality maybe at least a partial solution to eliminate health disparities, including those generated by MDRs of education in non-Whites.[1,2]

Another mechanism behind MDRs is labor market discrimination. Education does not generate the same occupation and income for Whites and Blacks simply because race shapes how labor market hires people. Under labor-market discrimination, education does not similarly translate to occupation, income, wealth, and insurance, which are all required for access to the healthcare and pro health behaviors. We argue that the US political system has historically promoted the well-being of Whites with the costs to Blacks and Hispanics.

Discrimination across US institutions systems,[54,55] including but not limited to the health care system,[56] is another mechanism by which MDRs develop. Due to a differential treatment, racial and ethnic minority groups have a lower trust toward the healthcare system. Across all outcomes, processes and illnesses, care is with lower quality for Blacks than Whites.[56] In this impaired relation with the health care system, and in such impaired quality of care, SES does not get a chance to translate to best health and health service use for Blacks.[16,17]

Some of the MDRs may be due to structural factors such as segregation. Due to residential segregation, racial and ethnic minorities are more likely to live in low-resource urban areas. This is also the context of high SES Blacks and Hispanics who stay with their communities. That means high SES Hispanics and Blacks in majority Hispanic or Black neighborhoods would experience difficulty accessing health care. Such context also does not promote health in other domains. Such areas have fewer available resources for healthy eating, exercise, and healthy lifestyle.[9,57] Thus, health does not become the first option and a priority in such highly segregated neighborhoods.[58-62]

In such social and physical environment, even if an individual is motivated to seek care, their environmental condition does not facilitate a healthy lifestyle. High crime and violence may become a barrier and reduce people's chance of engagement in a healthy lifestyle.[58-62] Thus, segregation and environment, and access to the healthcare system may become a major barrier against high SES Hispanics and Black people engage in pro-health behaviors. We still need to study whether and how such contextual constraints result in suboptimal health for high SES Blacks and Hispanics.[9]

### 5.1. Limitations

This study had various limitations. First, some SES indicators were not considered. These include wealth, employment, and assets. Future research should also explore how neighborhood-level and area-level factors contribute to the differential effects observed here. Both physical and social environment may have a role. For example, distance to health care facilities and public transportation may have some role. Third, we merely described the racial differences. We did not seek the explanatory variables that could explain (mediate) such effects. Fourth, our study had a simplistic view of adherence to the routine physician visits. Our outcome reflected a single self-reported item that was

measured 13 times. There is a need to study health care use using comprehensive measures including scheduled visits, no shows, adherence across domains. Such research may go beyond self-reports and use administrative and claim data. Finally, this study was limited to Black, Hispanic, and Whites. Future research should include other marginalized groups based on the country of origin, nativity, immigration status, and language.[63-68]

## 6. Conclusion

In summary, racial differences exist in the magnitude of the effect of educational attainment on % adherence to routine physician visits among American middle-aged and older adults. Educational attainment better increases the % adherence to routine physician visits for White than Black middle-aged and older adults. Our finding is in line with the growing literature on MDRs suggesting that education level generates significantly less health effects for racial and ethnic minority groups than the majority group. MDRs should be addressed as a core strategy if we want to eliminate health disparities that have persisted in the US.

## Conflict of Interest Disclosures

The author declares that he has no conflicts of interest.

## Ethical Approval

The HRS study protocol was approved by the University of Michigan (UM) Institutional Review Board (IRB). All HRS participants signed written consent. The data were collected, restored, managed, and analyzed in a fully anonymous fashion.

## Research Highlights

### What Is Already Known?

There is a particular interest in enhancing preventive behaviors and disease management of racial and ethnic minorities. This is because poor adherence to preventive care, screening, and disease management are among the major mechanisms by which racial and ethnic disparities in health emerge.

### What This Study Adds?

Some of the health disparities would be narrowed if we empower racial and ethnic minorities to leverage their resources. Thus, while some of the efforts should be on redistribution of resources, some other policies should address barriers that hinder Blacks from gaining the most out of their available resources.

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