The effect of race, sex, and social disadvantage on self-reported health in patients with chronic pain

Abby L Cheng, MD; Ethan C Bradley, BA; Brian Brady, BA; Ryan P Calfee, MD; Lisa M Klesges, PhD, MS; Graham A Colditz, MD, DrPH, MPH; Heidi Prather, DO

Washington University in St. Louis Brown School

Washington University in St. Louis School of Medicine

Introduction

- Twenty percent of Americans live with chronic pain that can interfere with employment, family responsibilities, and wellness.[1]
- Chronic pain disproportionately affects socially at-risk populations.[2]
- This study examines which sociodemographic variables correlate most with self-reported health in patients with chronic pain.
- We hypothesized that black race, female sex, and social disadvantage would each independently correlate with worse self-reported physical and behavioral health.

Methods

- **Study Design**
  - Cross-sectional study at academic medical center, 2015-2017
- **Subjects**
  - Inclusion criteria: Adult patients followed by a physiatrist for chronic musculoskeletal pain over multiple visits (n= 1,193)
  - Exclusion criteria: Pediatric patients and those with only one episode of pain
- **Variables of Interest**
  - Demographic variables: Sex and race
  - Social disadvantage: Measured by the Area Deprivation Index (ADI),[3] which quantifies residents' income, education, and housing quality (1-100%; low to high social deprivation)
  - Self-reported physical and behavioral health: Physical Function, Pain Interference, Anxiety, and Depression, measured by the Patient-Reported Outcomes Measurement Information System (PROMIS®)[4]
- **Primary Comparison**
  - Adjusted effect size of each sociodemograhic variable on patient-reported health
- **Statistical Analysis**
  - Each PROMIS measure was modeled using multiple linear regression; statistical significance was set at p <.05
  - Covariates included patients' age, sex, race, disparate social disadvantage (i.e., comparison between the most and least disadvantaged ADI national quartiles), and chronic opioid use status

Results

	Mean (SD) or n (%)	Missing (n)
Age (Years)	56.3 (13.0)	0
Male Sex	350 (29.3%)	0
Race		0
White	981 (82.2%)	
Black	186 (15.6%)	
Other	26 (2.2%)	
ADI quartile		80
Q1 (Least disadvantaged)	250 (22.5%)	
Q4 (Most disadvantaged)	312 (28.0%)	
Chronic Opioid Use	352 (31.6%)	80
PROMIS Score		
Physical Function	37.2 (7.6)	36
Pain Interference	63.7 (7.1)	40
Anxiety	55.1 (10.5)	256
Depression	50.4 (10.4)	53

Table 1. Sociodemographics and self-reported health of 1,193 patients with chronic musculoskeletal pain.

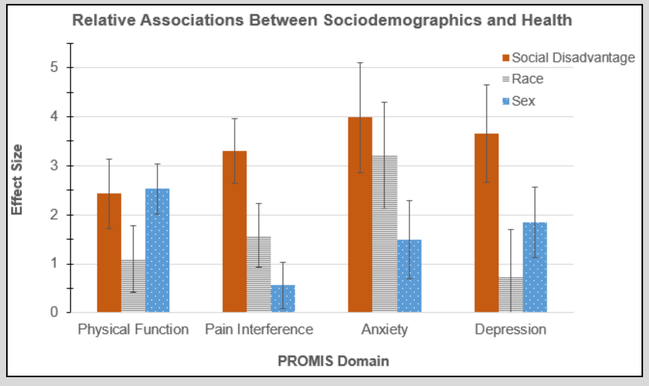

Figure 1. Y-axis: absolute value of each regression coefficient. "Social Disadvantage:" comparison of outcome measures between communities with disparate social disadvantage (ADI Q4 versus Q1). "Race:" Black versus White. "Sex:" Female versus Male. Error bars represent standard error.

	ADI Quartile				
Demographic n (%)	Q1 (n=250)	Q2 (n=271)	Q3 (n=280)	Q4 (n=312)	p-value
Female	164 (65.6%)	189 (69.7%)	197 (70.4%)	239 (76.6%)	**.036**
Black	10 (4.0%)	14 (5.2%)	32 (11.4%)	122 (39.1%)	**<.001**

Table 2. Q1 represents the least disadvantaged national quartile, and Q4 represents the most disadvantaged national quartile. Boldface indicates statistical significance when comparing all four quartiles (p<.05).

Discussion

- Disparate social disadvantage was the single variable consistently associated with worse physical and behavioral health in all domains assessed.
- Black race was only independently associated with worse anxiety symptoms, and female sex was only independently associated with worse physical function. However, both variables were disproportionately represented in the most disadvantaged communities.
- Our findings can be interpreted as encouraging because, unlike a person's race or sex, social disadvantage is a modifiable variable. Strategic efforts to create opportunities and improve geographic neighborhoods may be the most important type of intervention to achieve health equity in patients with chronic pain.
- The deeply rooted history of racial segregation and race-related health disparities in St. Louis emphasizes the need to understand associations between race and self-reported health in this region. Disproportionately high anxiety levels in Black patients may be addressable by tackling societal issues such as housing discrimination and exposure to disproportionate police violence.[5,6]

Conclusions

- In patients presenting with chronic musculoskeletal pain, **social disadvantage** was associated with **worse physical function, pain interference**, **anxiety**, and **depression** symptoms
- **Black** and **female** patients were more likely to live in socially disadvantaged neighborhoods
- Strategic investment to ameliorate disadvantage in geographically defined communities may be a key strategy to improving health in these at-risk populations with chronic pain.

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