

The differential effects of community social determinants of health in the relationship between community race/ethnicity and health outcomes in the United States: An intersectional analysis

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INTRODUCTION

- Studies have examined the association between race/ethnicity and access to community health care (1).
- Few studies investigated this relationship from an intersectional perspective of race/ethnicity and social determinants of health (SDoH) (2).
- Previous work is limited in its ability to explain how community SDoH (cSDoH) varies in its role between race/ethnic communities and health outcomes (3,4), especially among minority communities.
- Objective: To examine the role of cSDoH in the relationship between race/ethnicity and community health outcomes.
- Hypothesis: cSDoH has a mediating effect and its effect will vary between non-White or Hispanic race/ethnic populations and the NH (non-Hispanic) White population.

ENGAGEMENT WITH COMMUNITY PARTNERS

- Insights at the community level -- measured at the census tract.
- Findings are shared with the Ohio Department of Medicaid.
- Department of Medicaid uses our study findings to design care delivery and allocate critical health resources strategically to communities in Ohio.

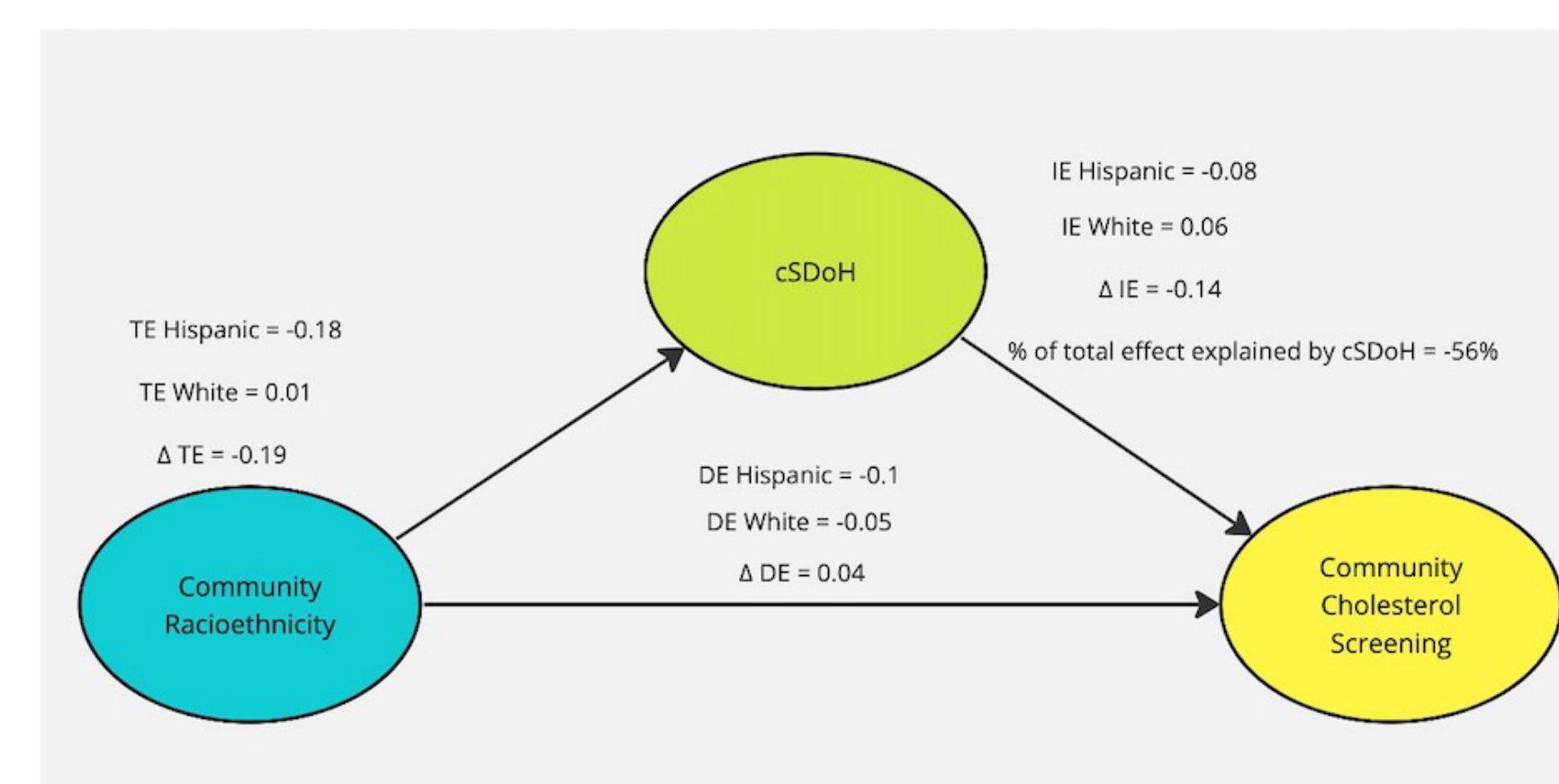
BENEFITS TO FIELD & PARTNERS

- We quantify differential effects of cSDoH, using the Ohio Opportunity Index (OOI) – a validated area-deprivation measure to inform community partners about how cSDoH impacts health outcomes.
- Our study informs intervention design and outreach efforts to the specific needs of diverse communities, leading to improved population health.
- Evidence empowers communities to have more knowledge to advocate and transform health care policies.

METHODS

- We use surveillance and demographic data for Ohio extracted from the 2020 Behavioral Risk Factor Surveillance System (BRFSS).
- We explore multiple community level measures from the BRFSS that focused on access and prevention.
- The cSDoH mediator is measured using the OOI, an index based on income, employment, transportation, crime, health, education, and housing quality.
- Mediation analysis involves estimating the total effect (TE) of community race/ethnicity on each health outcome and partitioning this effect into its direct (unmediated) and indirect (mediated) effects.
- We determine the estimates of the total effect of community race/ethnicity on each health outcome using a linear regression without the mediator.
- Based on linear regressions with the mediator, we obtain the direct effect (DE) and indirect effect (IE) estimates of community race/ethnicity on each health outcome.
- We calculate the proportion explained by cSDoH on the total effect (IE/TE).
- We assess our hypothesis, we analyze the differences in estimates of the total, direct, indirect, and proportion TE explained by IE between a minority community and the NH White community.

Pathway illustrating the mediating effect of cSDoH



TE: Total Effect; DE: Direct Effect; IE: Indirect Effect, which is the change in the magnitude of the effect of community race/ethnicity on community cholesterol screening after controlling for cSDoH.

RESULTS

Differences in mediating effect of cSDoH

Community SDoH Mediator	Total effect Coef (95% CI)	Direct effect Coef (95% CI)	Indirect effect Coef (95% CI)	% of total effect explained by cSDoH
Difference between non-Hispanic Black and Non-Hispanic White				
Access				
Health Insurance Access	-0.18 (-0.18, -0.18)	-0.07 (-0.07, -0.06)	-0.12 (-0.12, -0.12)	0%
Doctor Checkups	0.14 (0.14, 0.15)	0.16 (0.15, 0.16)	-0.04 (-0.04, -0.04)	-11%
Prevention				
Blood Pressure Medication	0.06 (0.05, 0.06)	0.07 (0.07, 0.08)	-0.03 (-0.04, -0.03)	0%
Cervical Cancer Screen	-0.06 (-0.07, -0.06)	0.07 (0.07, 0.08)	-0.13 (-0.14, -0.13)	0%
Cholesterol Screen	-0.01 (-0.02, 0.00)	0.12 (0.12, 0.13)	-0.13 (-0.14, -0.13)	0%
Colonoscopy Screen	-0.23 (-0.24, -0.22)	-0.01 (-0.02, -0.01)	-0.22 (-0.23, -0.22)	8%
Male Preventive Services	-0.26 (-0.27, -0.26)	-0.07 (-0.08, -0.07)	-0.19 (-0.21, -0.19)	2%
Female Preventive Services	-0.23 (-0.24, -0.23)	-0.09 (-0.1, -0.09)	-0.14 (-0.15, -0.14)	-6%
Dental Clinic Visits	0.44 (0.44, 0.45)	-0.06 (-0.07, -0.06)	-0.38 (-0.39, -0.38)	-7%
Mammography	0.12 (0.12, 0.13)	0.00 (-0.01, 0.01)	-0.04 (-0.05, -0.04)	0%
Difference between Hispanic and non-Hispanic White				
Access				
Health Insurance Access	-0.37 (-0.38, -0.36)	-0.19 (-0.19, -0.17)	-0.19 (-0.19, -0.17)	-21%
Doctor Checkups	-0.03 (-0.04, -0.3)	0.06 (0.05, 0.06)	0.00 (-0.01, 0.01)	-15%
Prevention				
Blood Pressure Medication	-0.10 (-0.12, -0.10)	-0.11 (-0.12, -0.11)	0.00 (-0.01, 0.01)	-42%
Cervical Cancer Screen	-0.19 (-0.20, -0.19)	-0.03 (-0.05, -0.03)	-0.15 (-0.17, -0.15)	-44%
Cholesterol Screen	-0.19 (-0.20, -0.19)	0.04 (0.03, 0.04)	-0.14 (-0.15, -0.14)	-56%
Colonoscopy Screen	-0.49 (-0.50, -0.49)	-0.19 (-0.20, -0.19)	-0.33 (-0.34, -0.33)	-38%
Male Preventive Services	-0.33 (-0.34, -0.32)	-0.04 (-0.05, -0.04)	-0.29 (-0.30, -0.29)	-20%
Female Preventive Services	-0.29 (-0.30, -0.29)	-0.06 (-0.07, -0.06)	-0.23 (-0.24, -0.23)	25%
Dental Clinic Visits	-0.62 (-0.63, -0.60)	-0.07 (-0.08, -0.07)	-0.56 (-0.57, -0.55)	0%
Mammography	0.08 (0.07, 0.09)	-0.08 (-0.09, -0.07)	-0.01 (-0.02, -0.01)	17%
Difference between Asian and non-Hispanic White				
Access				
Health Insurance Access	0.10 (0.08, 0.11)	0.00 (-0.01, 0.01)	0.10 (0.07, 0.14)	17%
Doctor Checkups	-0.05 (-0.06, -0.03)	-0.02 (-0.03, -0.02)	0.01 (0.00, 0.01)	-30%
Prevention				
Blood Pressure Medication	-0.49 (-0.52, -0.49)	-0.51 (-0.54, -0.48)	0.00 (-0.02, 0.00)	-48%
Cervical Cancer Screen	-0.06 (-0.07, -0.05)	-0.12 (-0.13, -0.11)	0.06 (0.04, 0.06)	0%
Cholesterol Screen	-0.04 (-0.06, -0.04)	-0.08 (-0.10, -0.07)	-0.05 (-0.07, -0.04)	0%
Colonoscopy Screen	0.14 (0.14, 0.15)	0.00 (-0.01, 0.01)	0.14 (0.11, 0.14)	4%
Male Preventive Services	0.31 (0.30, 0.32)	-0.01 (-0.02, -0.01)	0.14 (0.14, 0.15)	-22%
Female Preventive Services	0.24 (0.23, 0.25)	0.12 (0.11, 0.12)	0.11 (0.09, 0.12)	-13%
Dental Clinic Visits	0.57 (0.57, 0.63)	0.33 (0.30, 0.34)	0.23 (0.23, 0.25)	-36%
Mammography	0.23 (0.21, 0.25)	0.28 (0.25, 0.29)	-0.04 (-0.05, -0.04)	-21%

Table 1: Difference in mediating influence of cSDoH on relationship between access and preventive outcomes and race/ethnic population proportion for NH Black, Hispanic, and Asian race/ethnic populations compared to NH White.

- Non-White or Hispanic communities experienced differences from the NH White population in at least half of the outcomes examined.
- The Asian population was the only race/ethnic group to have better insurance access than the NH White population.
- Across race/ethnic groups, the percent of total effect explained by cSDoH were at least 10% higher compared to White populations for doctor checkups.
- For both cervical cancer and cholesterol screening, Hispanic was the only race/ethnic group that had a difference in TE explained by cSDoH.
- On average, the NH Black population had the least difference in %IE.

CONCLUSION

- Based on our mediation analysis, cSDoH has a variable effect in the relationship between community race/ethnicity and health outcomes.
- Our findings highlight the importance of an intersection perspective – health outcomes are impacted by multiple factors.
- Results indicate that certain interventions may vary in effectiveness dependent upon the race/ethnic and social determinant makeup of an area because of the variation in the role of cSDoH in our findings.
- It is essential to consider the impact of cSDoH on the specific community and health outcome.

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