

Associations Between Cumulative Social Risk, Psychosocial Risk, and Ideal Cardiovascular Health: Insights from the HeartSCORE Study

Julia Berkowitz, MD¹, Vishal Khetpal, MD, MSc¹, Justin B Echouffo-Tcheugui MD PhD², Aryan Aiyer, MD³, Kevin Kip PhD³, Steven Reis MD³, Sebhat Erqou, MD, PhD^{1,4}

¹Warren Alpert Medical School of Brown University, Providence, RI; ²Johns Hopkins School of Medicine, Baltimore, MD, ³University of Pittsburgh Medical Center, Pittsburgh, PA, ⁴VA Medical Canter, Providence, RI




Background

- Limited studies have assessed the effects of social risk factors on achievement of ideal cardiovascular health (CVH).
- This study examined the associations of cumulative social risk (CSR) and achievement of ideal CVH using data from the Heart Strategies Concentrating on Risk Evaluation (HeartSCORE) cohort study. We also evaluated the influence of psychosocial risk factors on the relationship between CSR and ideal CVH

Methods

- Using the Heart Strategies Concentrating on Risk Evaluation (HeartSCORE) cohort, we examined the cross-sectional associations of ideal CVH with cumulative social risk (CSR) and three psychosocial factors (depression, stress, perceived discrimination).
- CSR was calculated by assigning one point for each of: low family income, low education level, minority race, and single-living status.
- Ideal CVH was calculated by assigning one point for ideal levels of each component in Life’s Simple 7. Ideal CVH was dichotomized into low versus high by combining participants achieving <3 versus ≥3 factors.
- Logistic regression models were used to calculate odds ratios (ORs) and 95% confidence intervals (CIs) of having lower versus higher ideal CVH factors.
- Psychosocial factors were assessed as mediators of the association between CSR and ideal CVH.

VA



U.S. Department
of Veterans Affairs

Results

- We included 2000 participants (mean age 59.1 [7.5] years, 34.6% male, 42.7% Black, and 29.1% had low income), among whom 60.6% had <3 ideal CVH factors.
- The odds of having fewer ideal CVH factor increased significantly with increasing CSR scores from 1 to 2, to ≥3compared to individuals with CSR score of zero, after adjusting for age and sex (OR [95% CIs]: 1.77 [1.41 - 2.22]; 2.09 [1.62 - 2.69] 2.67 [1.97 - 3.62], respectively).
- The association was modestly attenuated after adjusting for depression, stress, and perceived discrimination (corresponding OR [95% CI]: 1.69 [1.34 - 2.12], 1.96 [1.51 - 2.55], 2.34 [1.71 - 3.20]). The psychosocial factors appeared to mediate between 10% and 20% of relationship between CSR and ideal CVH.

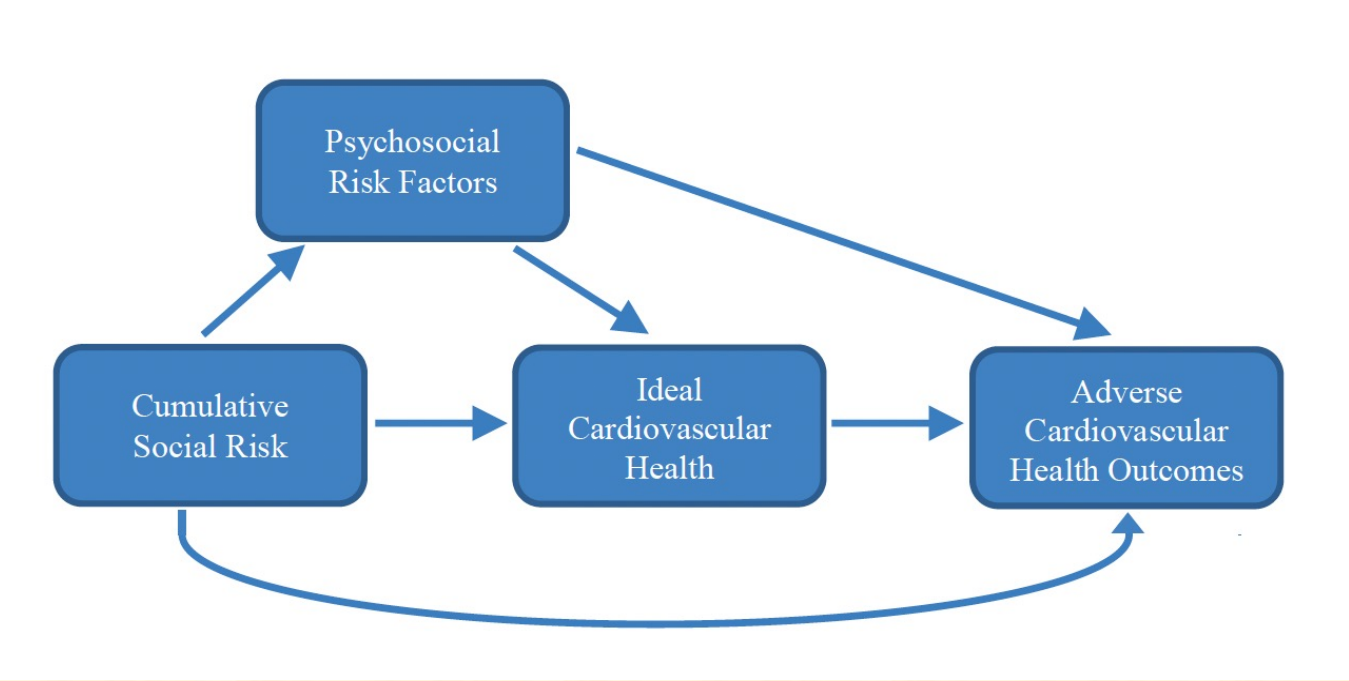


Figure 1: Conceptual Model of Interrelationships Between Cumulative Social Risk, Psychosocial Risk Factors, Ideal Cardiovascular Health and Adverse Cardiovascular Outcomes

Cumulative Social Risk (CSR) Score	≥ 3 ideal CVH Factors	< 3 ideal CVH Factors	p-value
	OR	OR (95% CI)	
		Adjusted for age and sex	
CSR = 1	ref	1.77 (1.41-2.22)	<0.0001
CSR = 2	ref	2.09 (1.62-2.69)	<0.0001
CSR ≥ 3	ref	2.67 (1.97-3.62)	<0.0001
		Adjusted for age, sex, depression, stress, and perceived discrimination	
CSR = 1	ref	1.69 (1.34- 2.12)	<0.0001
CSR = 2	ref	1.96 (1.51 – 2.55)	<0.0001
CSR ≥ 3	ref	2.34 (1.71 – 3.20)	<0.0001

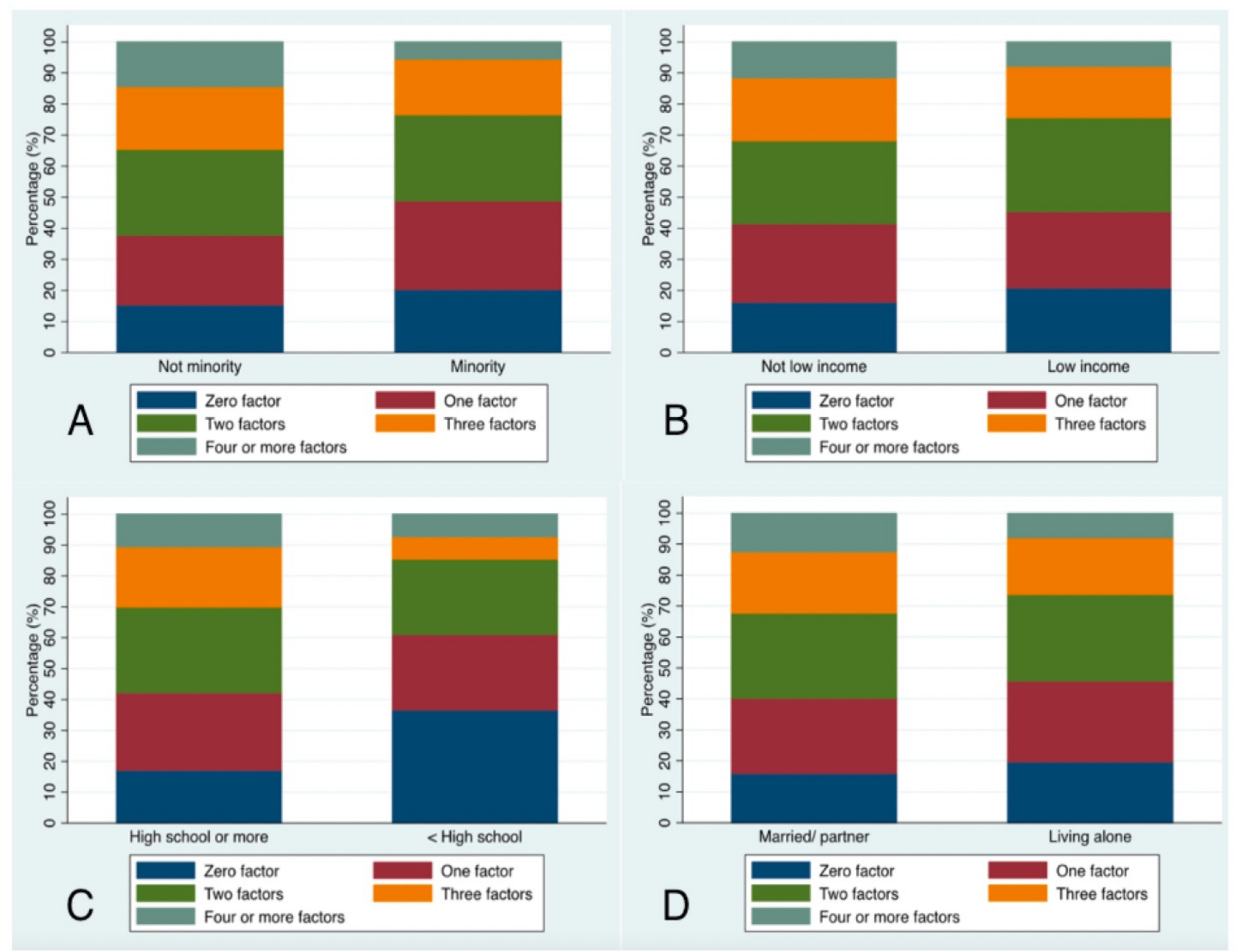


Figure 2: Proportion of Individuals Achieving a Given Number of Ideal Cardiovascular Risk Factors by Individual Social Risk Factors

Panel A –minority status: chi-2 = 59.4 (4 df), p<0.001; Panel B – income: 29.3 (4 df), p<0.001; Panel C – education status: chi-2 = 8.7 (4 df), p=0.07; Panel D– marital status: 23.0 (4 df), p<0.001

Figure 3: Odds Ratio of cumulative Social Risk Affecting Achievement of Ideal Cardiovascular Health

CSR- cumulative social risk, ideal CVH- ideal cardiovascular health, BMI- body mass index

Results Cont.

Cumulative Social Risk (CSR)	Total Effect OR (95% CI)	Direct Effect OR (95% CI)	Indirect Effect OR (95% CI)	Percent Modified % (95 % CI)
CSR = 1	1.77 (1.41-2.22)	1.69 (1.34-2.12)	1.05 (1.05-1.05)	10.4 (8.2-17.1)
CSR = 2	2.09 (1.62-2.69)	1.96 (1.51-2.55)	1.07 (1.05-1.07)	11.9 (8.3-17.7)
CSR ≥ 3	2.67 (1.97-3.62)	2.34 (1.71-3.20)	1.14 (1.13-1.15)	19.8 (16.0-26.8)

Figure 4: Mediation Analysis of Influence of Psychosocial Risk on Relationship Between Cumulative Social Risk and Ideal Cardiovascular Health

Discussion

- Our findings regarding the significant association of CSR with ideal CVH supports further attention to primary and primordial prevention public health strategies addressing these issues.
- Given the mediating effect of depression noted in this study, as well as findings from previous studies, additional primordial prevention strategies for cardiovascular health may also include access to mental health care for vulnerable populations.