Association between allostatic load and clinical and sociodemographic risk factors for breast cancer among diverse women undergoing screening mammography

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Introduction

Allostatic load (AL) is an index of cumulative physiological stress on the body, which is comprised of standard laboratory results and vital signs[1-5]

AL has been associated with increased breast cancer risk and increased mortality among patients diagnosed with breast cancer[6-9]

Objective: What is the association between demographic, clinical and lifestyle factors and AL among women undergoing screening mammography?

Methods

Study design: Retrospective cohort analysis

Study population: Women enrolled in the Electronic Medical Records and Genomics (eMERGE4) study, who underwent screening mammography at Columbia University Irving Medical Center (CUIMC)

- Completed surveys on demographic, clinical and lifestyle factors
- Provided samples for germline *BRCA1/2* and *PALB2* genetic testing and polygenic risk score (PRS) for breast cancer (308-SNP model)

Covariates: Demographic, clinical, and lifestyle factors obtained from survey data. Breast density and prior breast biopsy results obtained from the EHR.

Data analysis: Univariable and multivariable logistic regression analyses were conducted to evaluate the association between high AL and demographic, clinical, and lifestyle factors

Key Findings

1) In our diverse population of women undergoing screening mammography, we found a significant association between clinical, demographic, and socioeconomic factors and allostatic load (AL), which is a well-established breast cancer risk factor.

2) Older age, higher BMI, and having Medicaid are associated with high AL.

3) These findings highlight the importance of addressing modifiable risk factors, such as obesity, for reducing AL and breast cancer risk and the need to address psychosocial stressors in vulnerable populations on Medicaid.

Allostatic Load Calculation

Labs

- Albumin, alkaline phosphatase, BUN, creatinine, glucose, white blood cell count

Vitals

- Systolic blood pressure, diastolic blood pressure, pulse

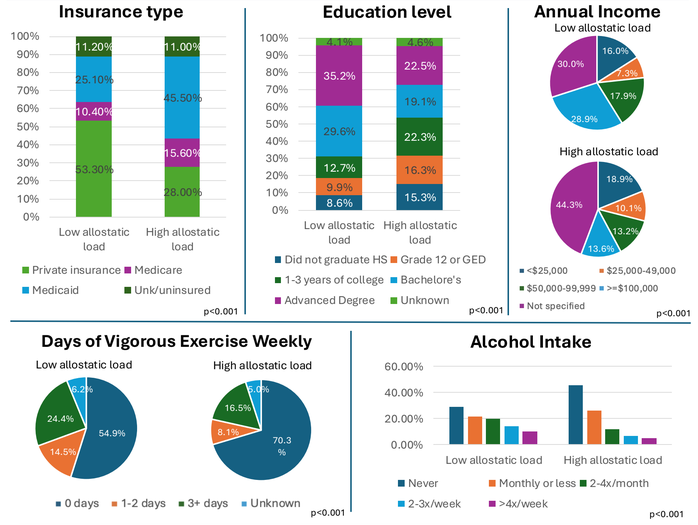
Calculation

- 1 point given for each biometric in the highest quartile except albumin which was assigned one point for the lowest quartile
- Patients with at least 5 out of 9 biometrics were included, and missing values for AL were imputed
- High AL: score >2 (median)

Baseline Characteristics

	Low AL (n=537, 56%)	High AL (418, n=44%)	p-value
Mean age, years (SD)	52.8 (10.9)	57.3 (11.5)	<0.001
Race/Ethnicity, n (%)			
Non-Hispanic White	217 (40.4)	116 (27.8)	<0.001
Non-Hispanic Black	39 (7.3)	48 (11.5)	
Hispanic	229 (42.6)	231 (55.3)	
Asian/Other	52 (9.7)	23 (5.6)	
Mean BMI, kg/m² (SD)	26.2 (5.6)	29.7 (6.6)	<0.001
Mean PRS, z-score (SD)	-0.001 (1.062)	0.145 (1.026)	0.045

Clinical and Sociodemographic Data



Multivariable Analysis

Characteristics	Adjusted OR (95% C.I.)	P-value
Age, continuous	1.03 (1.02, 1.05)	<0.001
BMI, continuous	1.09 (1.06, 1.12)	<0.001
Insurance		
Private	Reference	Reference
Medicare	1.53 (0.88, 2.66)	0.128
Medicaid	2.21 (1.30, 3.75)	0.003
Unknown/Uninsured	1.49 (0.76, 2.94)	0.248

*Also adjusting for race/ethnicity, breast density, breast biopsy results, PRS score, disability, alcohol intake, exercise level, education level, yearly income

References: **1)** Carlos JACR 2023 **2)** Feng Prev Med 2024 **3)** Rodriquez J Urban Health 2019 **4)** Seeman Arch Intern Med 1997 **5)** Seeman Soc Sci Med 2008 **6)** Obeng-Gyasi NPJ Breast Cancer 2021 **7)** Wallam ASCO Annual Meeting 2025 **8)** Guan Breast Cancer Res 2023 **9)** Guan JAMA Network Open 2025

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