The Prevalence of Chronic Pain and Other Adverse Health Outcomes Across Racial and Ethnic Groups in the UK Biobank

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INTRODUCTION

Allostatic load, the cumulative burden of stress, is associated with negative health outcomes, including chronic pain. Allostatic load has been proposed as a physiological mechanism of "weathering" – a theory which suggests racial and ethnic minority groups are at greater risk of adverse health outcomes due to long-term exposure to socioeconomic disadvantages and systemic inequities[1]. Research has demonstrated differences in pain prevalence between racial and ethnic groups[2]. This study aims to establish the prevalence of chronic pain and other chronic illnesses within racial and ethnic groups and to investigate factors contributing to group differences in adverse health outcomes.

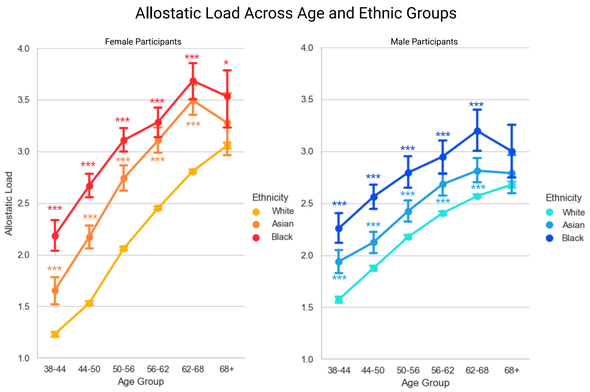

Figure 1. Allostatic load scores across different age groups, separated by sex and ethnicity. In both males and females, White participants had significantly lower allostatic load scores in all but the oldest age group.

METHODS

This study used baseline anthropometric, metabolic, cardiovascular and immune system measures, and self-reported sociodemographic data from the UK Biobank, a longitudinal cohort of over 500,000 participants. Pain and immigration status data were obtained from an in person questionnaire at the same visit. Diagnostic history was provided through hospital records. Allostatic load was computed using biomarkers commonly included in the literature[3], such as C-reactive protein, BMI and HbA1c. To capture subclinical levels of dysfunction, we used the 75th percentile value as a cut-off for measures where elevated risk was indicated by elevated levels and the 25th percentile value as a cut-off for measures where elevated risk was indicated by decreased levels. Each biomarker was binarized according to this cut-off. Individuals were given a value of 1 if their level corresponded to elevated risk and 0 otherwise. The values of the binarized biomarkers were then summed to create an allostatic load score. As many measures used to calculate allostatic load vary between males and females[4], scores were calculated within each sex separately. The prevalence of chronic pain, metabolic conditions, and cardiovascular conditions were calculated for each demographic group and chi-squared tests were used to determine the significance of group differences in prevalence, with Bonferroni corrections applied to account for the presence of multiple comparisons.

RESULTS

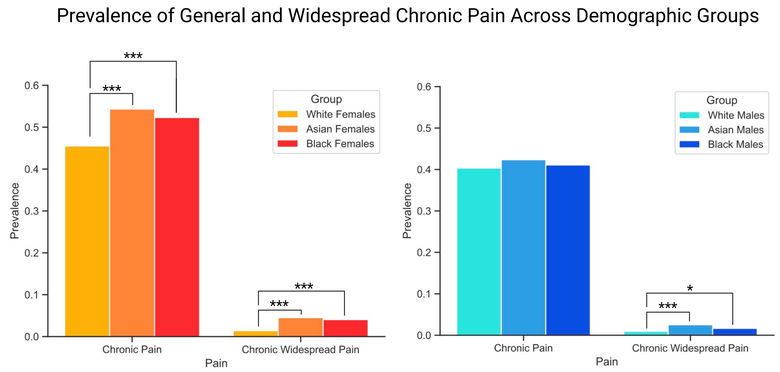

Figure 2. Prevalence of chronic pain in participants, stratified by ethnicity and sex. Chronic widespread pain was more prevalent in Black and Asian participants than White participants of the same sex for both sexes. Chronic pain was more prevalent in Asian participants and Black female participants than White participants. * , p < 0.05;**, p <0.01; ***, p < 0.001; Bonferroni corrected Chi-squared contingency tests.

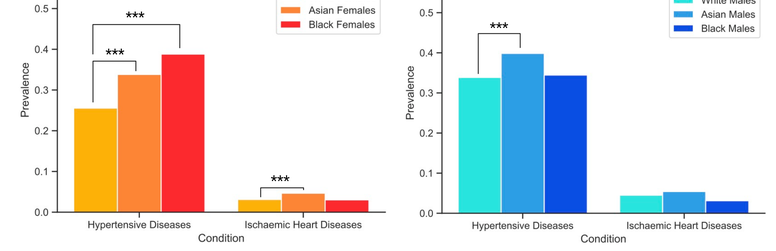

Figure 3. Prevalence of cardiovascular diseases in participants, stratified by ethnicity and sex. Hypertensive diseases were more prevalent in Asian participants than White participants of the same sex and more prevalent in Black female participants than in White female participants. The prevalence of ischaemic heart disease was higher in Asian female participants than in White female participants.

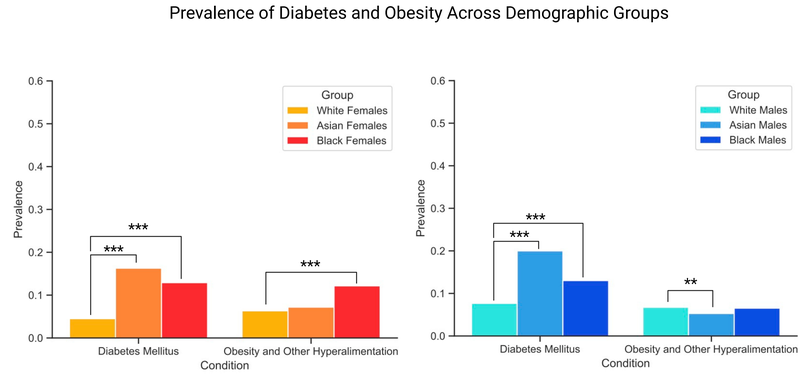

Figure 5. Prevalence of metabolic diseases in participants, stratified by ethnicity and sex. Diabetes was more prevalent in Asian participants and Black participants than in White participants. In females, Black participants had a higher prevalence of obesity than White or Asian participants and, in males, White and Black participants had a higher prevalence of obesity than Asian participants.

CONCLUSIONS

- **Chronic widespread pain was more prevalent in Asian and Black participants than in White participants** of both sexes, while general chronic pain was more prevalent only in female participants who identified as Asian or Black.
- **Hypertensive diseases were more prevalent in Asian and Black female participants and Asian male participants than in White participants** of the same sex. There were no significant differences in the prevalence of ischaemic heart disease between male participants but Asian female participants showed a higher prevalence than White female participants.
- **Diabetes was more prevalent in Asian and Black participants than in White participants** of both sexes. In females the highest prevalence of obesity was seen in Black participants but in males White participants showed higher prevalence of obesity than Asian participants.

FUTURE DIRECTIONS

- Investigating whether differences in the prevalence of these health conditions across racial and ethnic groups may be attributable to immigration status, socioeconomic status or other social factors.
- Expanding the analysis to include all reported ICD 10 diagnoses, in order to determine whether some chapters of disease show stronger relationships with race and ethnicity than others.
- Determining whether allostatic load mediates differences in disease prevalence.
- Introduce other measures of premature aging, such as telomere length and calculations of organ age , to examine weathering in participants with different racial or ethnic identities.

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