

EP14.12 Does Uteroplacental Insufficiency Mediate Adverse Outcomes Attributed to Social Deprivation?

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Background

Social deprivation is linked with a higher risk of hypertensive disorders of pregnancy (HDP), but the biological pathway is unclear. Uterine artery pulsatility index (UtA PI) is a marker of uteroplacental vascular resistance and may mediate this relationship.

Objectives

Primary objective: To determine whether area-level social deprivation is associated with UtA PI across pregnancy
Secondary objectives: To explore the influence of ethnicity on UtA PI and assess healthcare attendance rates across deprivation deciles.

Methods

Retrospective cross-sectional analysis of 21,578 singleton pregnancies who delivered at a large UK tertiary maternity unit (1st January 2020- 31st January 2025) with a UK postcode recorded. Mean UtA PI was recorded at first-trimester dating (T1), second-trimester anomaly (T2) and third-trimester growth (T3) scans. UtA PI values were converted to multiples of the median (MoM) to adjust for gestational age. Area-level deprivation deciles were calculated from postcodes using the Index of Multiple Deprivation (IMD) 2019.

Statistical Analysis

Statistical analysis was performed in Rstudio (v4.3). Multivariable linear and logistic regression models evaluated the associations between area-level deprivation, UtA PI and scan attendance.

Results

- Mean Ut A PI fell across gestation in all IMD deciles.
- After adjusting for gestational age, social deprivation did not materially influence UtA PI. Each IMD decile increase (lower deprivation) was associated with a statistically significant but clinically negligible reduction in UtA PI at at T1 (β = -0.005, 95% CI -0.009 to -0.001, p=0.008), T2 (β = -0.006, 95% CI -0.008 to -0.003, p<0.001), and T3 (β = -0.004, 95% CI -0.006 to -0.002, p<0.001).
- Ethnicity showed a persistent association, Black women had a higher adjusted mean UtA PI than White women at all time points with smaller differences between South Asian women and White women.
- Attendance within the first-trimester screening window was only 50.7% in the most deprived decile compared with 75-81% in the least deprived groups, representing an approximately 30 percentage-point difference.

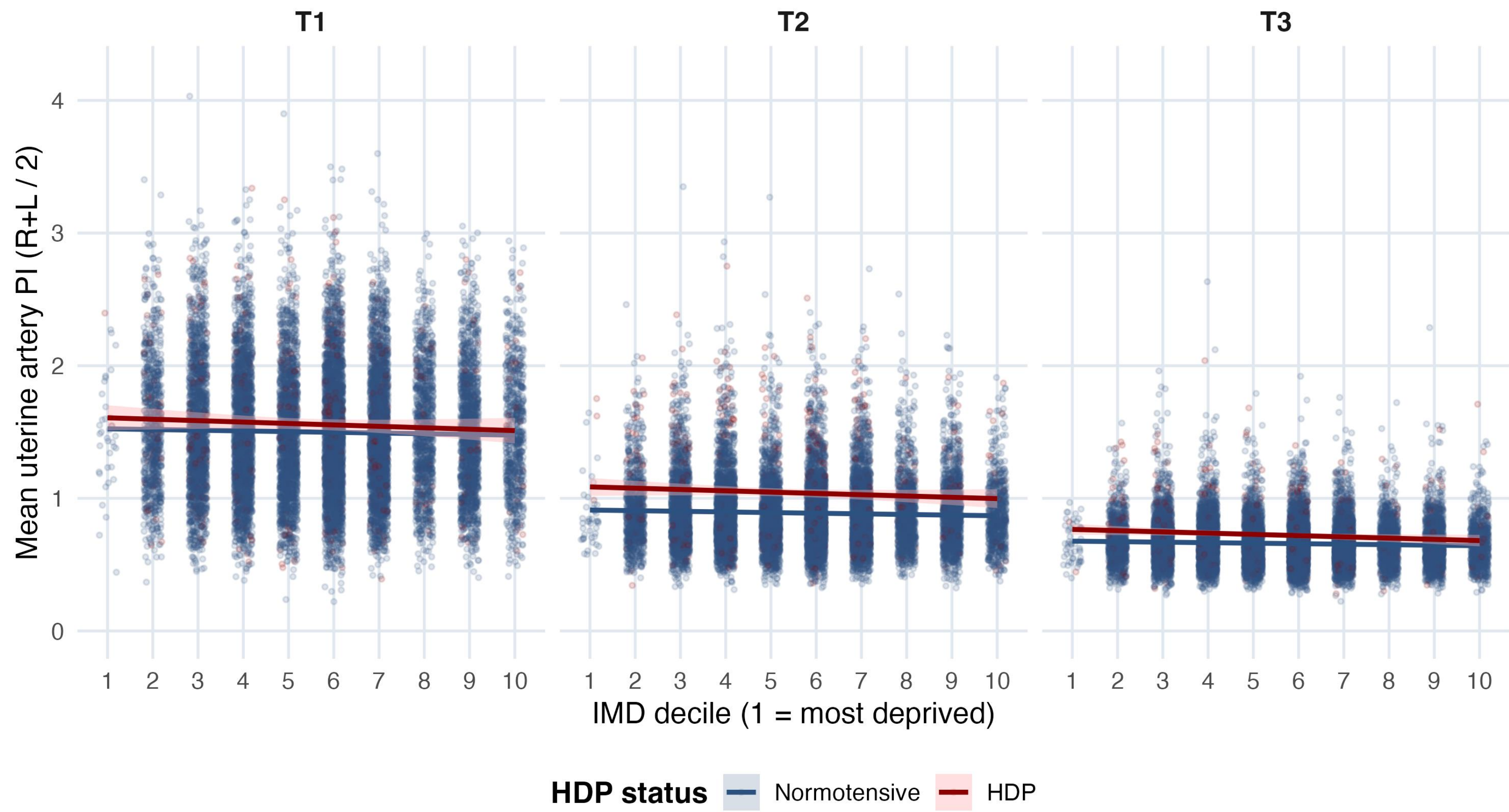


Figure 1: Uterine artery mean PI versus IMD decile by HDP status

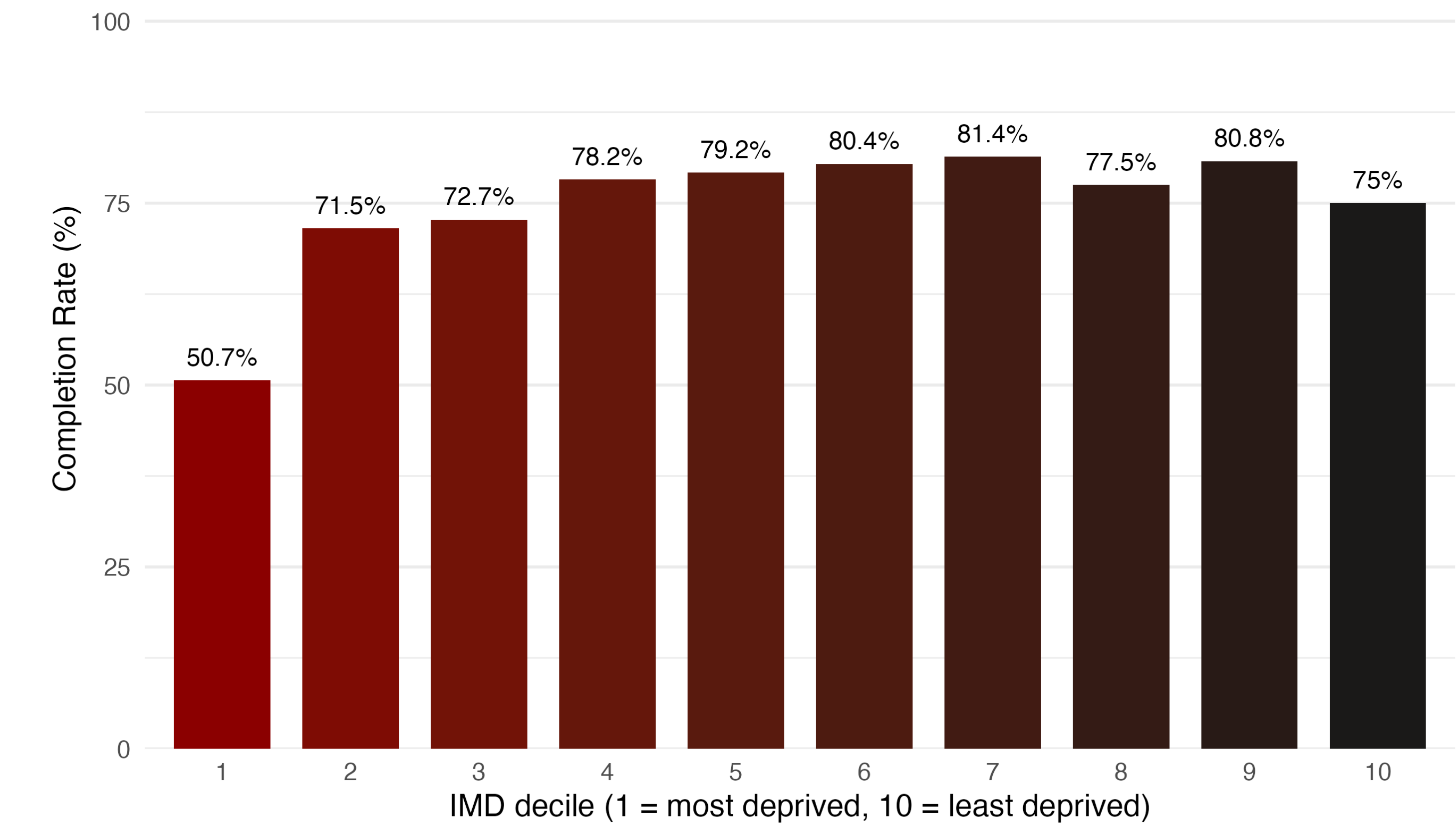


Figure 2: Attendance at routine first-trimester dating scan by IMD decile

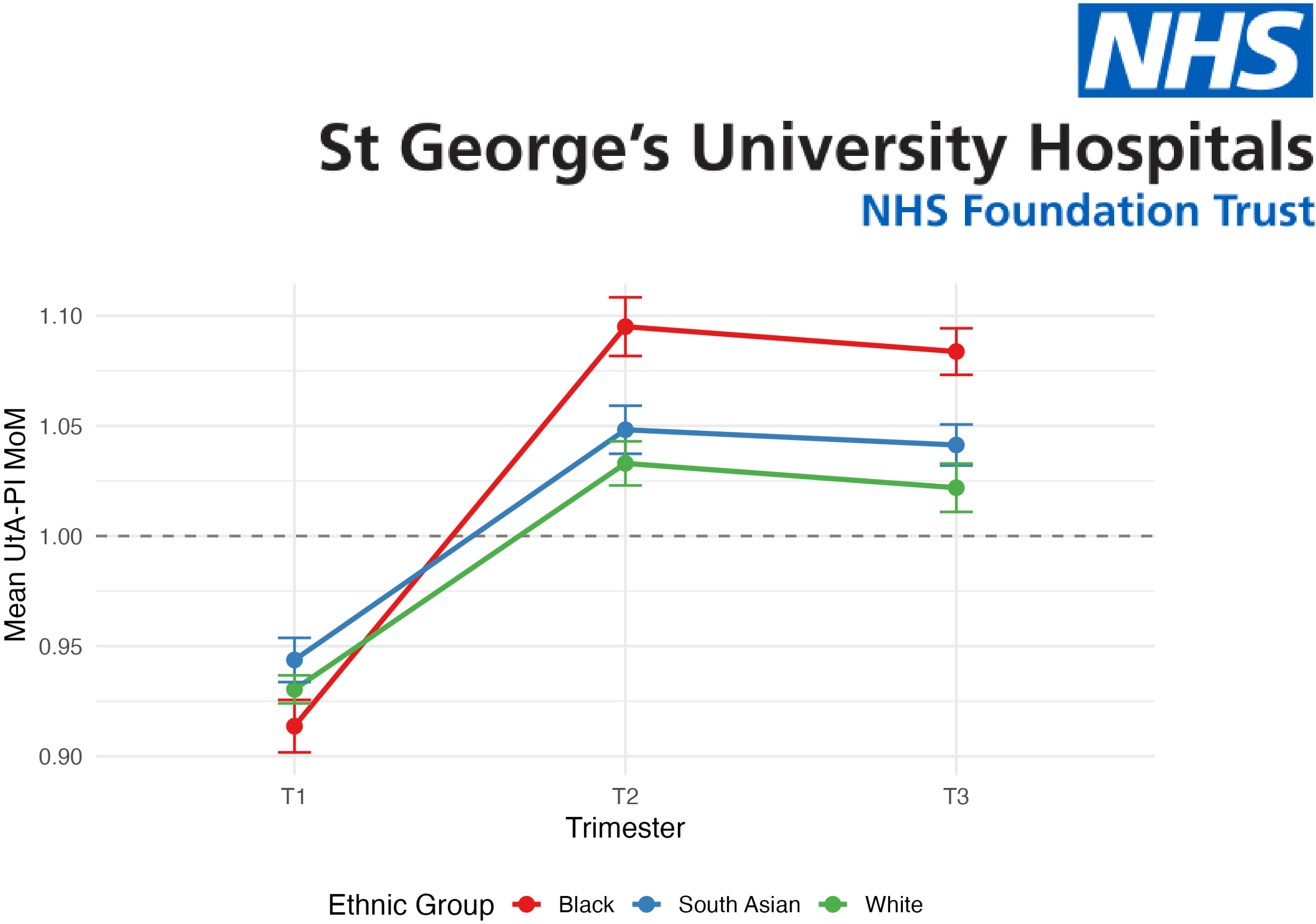


Figure 3: GA-Adjusted UtA PI MoM across Gestation by Ethnic Group

Discussion

Social deprivation was not associated with a clinically meaningful difference in UtA PI across pregnancy. This suggests socioeconomic inequalities in HDP may not primarily act through altered uteroplacental Doppler resistance and other pathways (e.g. endothelial, behavioural, access to care) may be more important. Systemic barriers to care evidenced by low attendance at routine first-trimester screening (~30% drop) warrant dedicated investigation as primary drivers of inequality. Differential attendance rates may introduce selection bias, as women from the most deprived deciles with available UtA PI measurements may not be fully representative of the underlying population.

Ethnic disparities call for further study

Persistent ethnic differences in UtA PI, independent of area-level deprivation, point to complex disparities that warrant further investigation.

Conclusion

Area-level social deprivation was not associated with clinically meaningful differences in uteroplacental Doppler resistance. However, the marked socioeconomic gradient in antenatal screening attendance suggests that structural inequalities in healthcare access, rather than altered uteroplacental physiology, may be the primary drivers of adverse outcomes like HDP.