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Exploratory analysis of the relationship between TNF-α and SBP in the baseline cohort of the dietary approaches to stop hypertension (DASH)-sodium trial

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Title: Exploratory Analysis of The Relationship Between TNF-α and SBP in The Baseline Cohort of The Dietary Approaches to Stop Hypertension (DASH)-Sodium Trial

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Background: Hypertension (HT), is a leading global noncommunicable cause of mortality and dietary salt is the most common modifiable risk factor for hypertension. Salt sensitive (SS) hypertension (HT) occurs in approximately 50% of the hypertensive and 25% of the normotensive populations, but mechanisms of SSHT are complex and present challenges to identifying those who are SS. SSHT appears to relate to demographic differences in populations, specifically genetic and physiological differences in sodium resorption in blacks compared to whites.

Evidence suggests that tumor necrosis factor alpha (TNFα), a multifunctional cytokine, may be a modulator in the mechanism of SSHT. We conducted a secondary analysis of the baseline cohort of the Dietary Approaches to Stop Hypertension (DASH)-Sodium trial, to explore the relationship between TNF-α and SBP in subjects categorized by race, sex, and baseline hypertension (bHT).

Methods: 24-hour urinary TNF-α levels adjusted for creatinine (pg/mg), were measured in 374 (91%) of the original 412 subjects using a modified plasma enzyme-linked immunosorbent assay. Descriptive analyses were used to determine the sample prevalence of demographic, laboratory and outcome variables. Race included African American (AA) and non-AA, and bHT was defined as > 140 SBP and > 90 DBP. Bivariate analyses were used to identify highly correlated factors. Multiple linear regression was used to evaluate the association of TNF-α and SBP with and without covariates, $p < 0.05$.

Results: The study population was 56.83% AA and female and 40.98% bHT. AA were more likely female with higher DBP and lower education, urine volume, potassium, and TNF-α levels than non-AA. Females had lower education, income, sodium, potassium, but higher SBP than males. Those with bHT were older than normotensives. Increased SBP was significantly associated with increased TNF-α, after adjusting for race, sex, urinary potassium and urinary sodium.

Conclusion: These results suggest that TNF-α can be measured in the urine and appears to be associated with SBP after adjusting for covariates. Further, this association is consistent with the hypothesis that TNF-α may be released in response to high salt intake.