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Self-reported energy trajectories predict frailty, disability, and mortality in older adults

Briana N. Sprague, Rebecca Ehrenkranz, Xiaonan Zhu, Teresa Tian, Theresa A. Gmelin, Nancy W. Glynn, Andrea L. Rosso, & Caterina Rosano

Decreases in energy over time may indicate homeostatic dysregulation and predict concurrent increases in frailty, as well as incident mobility disability and mortality. We hypothesized that declining self-reported energy would be associated with (1) worsening frailty, (2) increasing incident mobility disability, and (3) greater mortality. This observational cohort studies included 2,444 older adults (mean age = 74.58, 62.52% White, 47.79% men) from the Health ABC Study with up to eight years of data. Self-reported energy was assessed using a single-item question about the prior month’s energy level (baseline mean = 6.72, SD = 1.74, range = 0 – 12, higher = more energy). Person-specific energy trajectories were created using linear mixed models and reflected the annual change in energy (mean = -.07, SD = .05, range = -0.32 - 0.21, positive = increased energy over time). Regression models adjusting for baseline energy level demonstrated that those with greater declines in energy had worsening frailty ($\beta$ = -3.20, $p < .001$), were less likely to experience mobility disability (log odds = -3.60, odds = 0.03, $p < .001$), and 93.7% less likely to die (HR = .06, $p < .001$). Changes in self-reported energy are easy to assess and predict clinically-relevant outcomes. Future work should consider the role of decreasing energy on other disability-related outcomes.
Abstract:

Background: Social engagement may protect against cognitive decline in older adults, but associations with brain structure are not well understood.

Objectives: To estimate associations of social engagement (SE) with gray matter (GM) microstructure in regions of interest (ROI) relevant to social cognition, among community-dwelling older adults.

Design: Cross-sectional analysis of a cohort study.

Setting: A subset of Health ABC study participants who underwent 3 Tesla magnetic resonance imaging with diffusion tensor and were free from cognitive impairment.

Participants: 293 subjects, mean age: 82.84 years (SD: 2.76); 42.7% males, 39.3% black.

Measurements: Linear regression models tested associations between social engagement (SE) index (marital status, not living alone, social activities, work, and volunteering) and mean diffusivity (MD) of gray matter, adjusted for age, race, gender, and education. ROIs included prefrontal cortex, cingulate cortex, hippocampus, caudate, putamen, temporal pole, amygdala, thalamus and language areas. Effect modification by gender was tested with interaction terms and stratification by gender. Hearing difficulty and activities of daily living (ADL) difficulty were tested as confounders.

Results: Higher SE was significantly related to lower MD (greater gray matter microstructural integrity) [shown as standardized estimate (p-value)] in: left middle frontal gyrus-orbital part:
-0.168 (0.005), left caudate nucleus: -0.141 (0.02), left temporal pole-middle temporal gyrus: 
-0.136 (0.03), right middle frontal gyrus: -0.160 (0.006), right superior frontal gyrus-orbital part: 
-0.187 (0.002), right middle frontal gyrus, orbital part: -0.124 (0.04), adjusted for demographic 
attributes. Associations were robust to adjustments for hearing or ADL difficulty. There was 
significant effect modification by gender for some regions, where associations were present only 
for females.

Conclusion: SE is related to greater microstructural integrity of GM regions in the brain relevant 
to social cognition. Social engagement may therefore be a useful preventive mechanism against 
loss of gray matter integrity in older adults.
PRECONCEPTION THYROID DYSFUNCTION AND RISK OF PRETERM DELIVERY *Fouzia Farooq*, Kalpana Betha², Gong Tang³, P.S. Reddy², 4, Catherine L. Haggerty¹, 5

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**Background:** The biologic pathways leading to preterm birth (PTB), a primary contributor to neonatal morbidity and mortality, are incompletely understood. The status quo seeks to determine associations between potential exposures and PTB once pregnancy begins, and major gaps remain in understanding the effects of preconception period exposures. Thyroid hormones are critical regulators of early fetal development and play a role in pregnancy maintenance. Several studies have correlated thyroid dysfunction during early pregnancy with PTB. However, the impact of preconception thyroid hormone abnormalities on the risk of PTB is largely unexplored. **Methods:** We modelled the relationships between preconception thyroid function and PTB among 675 women aged 15-35 years with singleton pregnancies who participated in the Longitudinal Indian Family heath (LIFE) study, a population-based prospective pregnancy cohort study conducted in Telangana, India. Thyroid function was assessed at a mean of 12.8 months prior to pregnancy. Odds ratio (OR) and 95% confidence intervals (CI) of PTB (<37 weeks of gestation) were modeled with a log link binomial distribution. Models were adjusted for maternal age at conception, BMI, and education level. **Results:** The rate of PTB was high in this cohort (14.1%). Women who were affected by hyperthyroidism and hypothyroidism were at marginally increased risks of PTB compared to euthyroid women ((OR: 2.15, 95% CI 0.81 – 5.67) and (OR: 1.22, 95% CI 0.26 – 5.66)), respectively. **Conclusion:** Our data suggests that women diagnosed with hyperthyroidism or hypothyroidism during the preconception period may have a higher risk of PTB. The period prior to conception may be a critical window to identify women at risk for PTB who may benefit from intervention. Additional studies are needed to further explore the links between thyroid function and PTB subtypes and may support the need for routine universal thyroid function screening among reproductive-age women.