Diagram

Description automatically generated**Figure S1. Directed acyclic graph showing causal relationship of endogenous thyroid-related hormones with hypertension and blood pressure measures in Hispanic/Latino adults**

a Endogenous thyroid hormones: 1) Thyroid hormones measured at baseline examination: thyroid stimulating hormone (TSH), free thyroxine (FT4), and triiodothyronine (T3)

b Hypertension and blood pressure measures: 1) hypertension status defined as normotension, pre-hypertension and hypertension; and 2) blood pressure measures namely systolic blood pressure, diastolic blood pressure and pulse pressure

c Potential confounders: 1) Demographic and socio-economic status measures (SES) such as age, HCHS/SOL study sites, education, Hispanic/Latino background, and acculturation score-MESA; 2) adiposity namely BMI and waist circumference; 3) total serum lipids; 4) Medication use namely cholesterol lowering medications and NSAIDs; 5) lifestyle factors such as healthy eating index, smoking, alcohol consumption, and physical activity; 6) family history of hypertension; 7) C-reactive protein; and 8) comorbidities namely prediabetes status, chronic kidney disease, and sleep apnea syndrome

d Dotted lines represent possible bi-directional relationships which should be taken into consideration when interpreting analysis findings

**Table** **S1. Study selection table for association of endogenous thyroid-related hormones and hypertension in Hispanic/Latino adults**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **N Females** | **N Males** |
| **Starting Number** | 2,343 | 1,197 | 1,146 |
| **Pre Or Peri Menopausal** |  | 363 | 0 |
| **Medication Exclusionsa** | Metformin | 10 | 0 |
|  | Androgens, Anabolic Steroids, Estrogens, Progestins | 41 | 4 |
|  | Antineoplastic Hormonal Agents, Antiadrenals, Aromatase Inhibitors, Luteinizing Hormone-Releasing Hormone (LHRH) Analogs, Gonadotropin Releasing Hormone (GNRH), LHRH/GNRH Agonists, Hormone Receptor Modulators, Fertility Modulators | 12 | 0 |
|  | Vaginal Estrogens And Progestins | 1 | 0 |
|  | 5-Alpha Reductase Inhibitors | 0 | 31 |
|  | Corticosteroids, Glucocorticoids, Mineralocorticoids | 11 | 8 |
|  | Carbamazepine, Phenobarbital, Phenytoin | 6 | 8 |
|  | Thyroid and Antithyroid Medications | 90 | 21 |
|  | Prolactin Inhibitors, Dopamine Receptor Agonists - D1 And D2, Levodopa, Antiparkinsonian Dopaminergic, Lithium, Amiodarone | 13 | 10 |
| **Total at V1** |  | 716 | 1,073 |
| **Individuals with hypertension at V1** |  | 402 | 589 |
| **Total at V2** |  | 314 | 484 |
| **Missing blood pressure measures before multiple imputation** | **Females**: SBP at visit 2=1; pulse pressure at visit 2=1 | | |
|  | **Males**: DBP at visit 2=2; DBP at baseline=1; pulse pressure at visit 2=2 | | |
| **Missing medications before multiple imputation** | **Females**: antihyperlipidemic=28; BP medication at V1=10; BP medication at V2=23 | | |
|  | **Males**: antihyperlipidemic=24; BP medication at V1=8; BP medication at V2=21 | | |
| **Missing hormones before multiple imputation** | **Females**: TSH=1; FT4=2 | | |
|  | **Males**: TSH=2; T3=1; FT4=3 | | |
| **Missing covariates before multiple imputation** | **Females**: education=2; physical activity level=2; smoking status=4; alcohol use=6; waist to hip ratio=2; AHEI-2010=8; live births=15; sleep apnea syndrome=107; BMI at V2=26; waist to hip ratio at V2=26; acculturation score – MESA=4 | | |
|  | **Males**: education=2; BMI=2; physical activity level=5; smoking status=5; alcohol use=2; waist to hip ratio=3; C-reactive protein=1; AHEI-2010=11; sleep apnea syndrome=114; BMI at V2=28; waist to hip ratio at V2=36; acculturation score – MESA=6 | | |

a Not all exclusions are mutually exclusive

**Table** **S2.** **Weighted mean (95% CI) of endogenous thyroid-related hormones by hypertension status at baseline examination among Hispanic/Latino postmenopausal women and men (N=716)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Hormones** | **Normotensive** | **Pre-hypertensive** | p-valuea | **Hypertensive** | p-valueb |
| **Postmenopausal women** |  |  |  |
| **Total; N=716** | **217 (23.4%)** | **97 (15.5%)** | **402 (61.1%)** |
| **TSH (mIU/L); GM (95% CI)** | 1.70 (1.5, 1.91) | 1.71 (1.51, 1.94) | 0.854 | 1.84 (1.51, 2.24) | 0.460 |
| **T3 (ng/dL); Mean (95% CI)** | 122.4 (117.7, 127.0) | 131.5 (122.2, 140.7) | 0.078 | 121.75 (116.0, 127.5) | 0.865 |
| **FT4 (ng/dL); Mean (95% CI)** | 1.14 (1.11, 1.18) | 1.17 (1.14, 1.21) | 0.309 | 1.12 (1.06, 1.17) | 0.421 |
| **T3/FT4 Ratio; Mean (95% CI)** | 108.8 (103.8, 113.9) | 113.7 (103.9, 123.6) | 0.382 | 112.4 (107.7, 117.1) | 0.313 |
| **TSH/FT4 Ratio; GM (95% CI)** | 1.50 (1.31, 1.72) | 1.47 (1.31, 1.66) | 0.887 | 1.71 (1.29, 2.26) | 0.396 |
| **TSH/T3 Ratio; GM (95% CI)** | 0.014 (0.012, 0.016) | 0.013 (0.011, 0.015) | 0.543 | 0.016 (0.012, 0.020) | 0.493 |
| **Men** |  |  |  |  |  |
| **Total; N=1,073** | **324 (25.9%)** | **160 (15.0%)** |  | **589 (59.1%)** |  |
| **TSH (mIU/L); GM (95% CI)** | 1.67 (1.53, 1.82) | 1.73 (1.35, 2.21) | 0.787 | 1.59 (1.49, 1.69) | 0.485 |
| **T3 (ng/dL); Mean (95% CI)** | 127.5 (123.8, 131.1) | 126.5 (118.1, 135.0) | 0.854 | 129.8 (126.8, 132.7) | 0.330 |
| **FT4 (ng/dL); Mean (95% CI)** | 1.15 (1.12, 1.18) | 1.21 (1.15, 1.27) | 0.061 | 1.16 (1.14, 1.18) | 0.835 |
| **T3/FT4 Ratio; Mean (95% CI)** | 113.2 (109.1, 117.1) | 106.6 (99.1, 114.0) | 0.131 | 114.1 (111.1, 117.1) | 0.687 |
| **TSH/FT4 Ratio; GM (95% CI)** | 1.47 (1.33, 1.62) | 1.45 (1.15, 1.83) | 0.940 | 1.39 (1.30, 1.49) | 0.351 |
| **TSH/T3 Ratio; GM (95% CI)** | 0.013 (0.012, 0.015) | 0.014 (0.011, 0.018) | 0.705 | 0.012 (0.011, 0.013) | 0.234 |

a P-values are comparing prehypertensive vs normotensive individuals

b P-values are comparing hypertensive vs normotensive individuals

GM: geometric mean

**Table S3. Multivariable linear regression models for prospective associations of endogenous thyroid-related hormones in quartiles with change in blood pressure measuresa,b among Hispanic/Latino men and postmenopausal women**

|  |  |  |  |
| --- | --- | --- | --- |
| **Hormones** | **Change in SBP**  **(V2-V1)** | **Change in DBP**  **(V2-V1)** | **Change in pulse pressure**  **(V2-V1)** |
| **Postmenopausal women**  **N=716** | **β (95% CI)** | **β (95% CI)** | **β (95% CI)** |
| **TSH (mIU/L)**; Q2 vs Q1 | 0.18 [-3.19,3.55] | 1.32 [-0.61,3.24] | -1.08 [-3.52,1.35] |
| Q3 vs Q1 | -1.10 [-4.60,2.41] | 0.24 [-1.99,2.48] | -1.53 [-4.24,1.17] |
| Q4 vs Q1 | -0.63 [-4.55,3.28] | 1.99 [-0.59,4.57] | -2.70 [-5.49,0.10] |
| p for Trend | 0.613 | 0.271 | 0.080 |
| **T3 (ng/dL)**; Q2 vs Q1 | 2.96 [-0.98,6.91] | 1.33 [-1.05,3.72] | 1.45 [-1.48,4.37] |
| Q3 vs Q1 | 3.68 [0.30,7.05]\* | 1.38 [-0.78,3.53] | 2.25 [-0.32,4.82] |
| Q4 vs Q1 | 7.00 [3.17,10.84]\* | 2.19 [-0.16,4.54] | 4.86 [2.11,7.61]\* |
| p for Trend | 0.0003 | 0.075 | 0.0004 |
| **FT4 (ng/dL)**; Q2 vs Q1 | -0.22 [-3.82,3.38] | 0.69 [-1.31,2.70] | -0.76 [-3.35,1.84] |
| Q3 vs Q1 | 0.85 [-3.10,4.79] | 1.17 [-1.11,3.44] | -0.42 [-3.25,2.41] |
| Q4 vs Q1 | 1.99 [-1.59,5.57] | 1.82 [-0.71,4.36] | -1.08 [-3.52,1.35] |
| p for Trend | 0.221 | 0.160 | 0.847 |
| **Men**  **N=1,073** |  |  |  |
| **TSH (mIU/L)**; Q2 vs Q1 | -3.81 [-7.67,0.06] | -2.48 [-4.49,-0.48]\* | -1.34 [-3.97,1.30] |
| Q3 vs Q1 | -1.49 [-4.72,1.74] | -1.46 [-3.47,0.55] | 0.01 [-2.13,2.15] |
| Q4 vs Q1 | -0.27 [-3.87,3.34] | -0.74 [-2.98,1.49] | 0.43 [-2.07,2.94] |
| p for Trend | 0.723 | 0.832 | 0.501 |
| **T3 (ng/dL)**; Q2 vs Q1 | 4.11 [0.37,7.85]\* | 1.08 [-0.99,3.16] | 3.14 [0.71,5.56]\* |
| Q3 vs Q1 | 3.36 [-0.31,7.02] | -0.91 [-3.05,1.23] | 4.29 [1.82,6.76]\* |
| Q4 vs Q1 | 3.30 [-0.52,7.12] | -0.01 [-2.04,2.03] | 3.53 [0.96,6.10]\* |
| p for Trend | 0.118 | 0.673 | 0.005 |
| **FT4 (ng/dL)**; Q2 vs Q1 | 0.93 [-2.33,4.19] | 0.85 [-1.07,2.77] | -0.02 [-2.28,2.24] |
| Q3 vs Q1 | -1.19 [-4.97,2.59] | -0.27 [-2.25,1.70] | -0.87 [-3.41,1.68] |
| Q4 vs Q1 | -0.64 [-3.98,2.71] | -0.93 [-3.02,1.15] | 0.28 [-1.97,2.52] |
| p for Trend | 0.438 | 0.215 | 0.986 |

a Hypertensive individuals at baseline were excluded and hypertension status was defined using ACC/AHA guidelines

b Model adjusted for age, Hispanic/Latino background, recruitment center, acculturation score-MESA, educational attainment, family history of hypertension, NSAIDs, lipid lowering medications, physical activity level, alcohol consumption, smoking status, AHEI-2010, body mass index, waist to hip ratio, change in BMI, change in waist to hip ratio, total lipids, C-reactive protein, prediabetes status, sleep apnea and chronic kidney disease

† Natural log transformed; Q4: quartile 4; Q3: quartile 3; Q2: quartile 2; Q1: quartile 1

\*p<0.05

**Table** **S4. Multivariable Poisson regression models for prospective associations of endogenous thyroid-related hormones in quartiles with incident prehypertension and hypertensiona,b among postmenopausal Hispanic/Latino women; N=314**

|  |  |  |  |
| --- | --- | --- | --- |
| **Hormones** | **Normotension at V1 → Prehypertension at V2**  N=30/160c | **Normotension at V1 → Hypertension at V2**  N=57/187d | **Prehypertension at V1 → Hypertension at V2**  N=58/97e |
| **Total; N=314** | **IRR (95% CI)** | **IRR (95% CI)** | **IRR (95% CI)** |
| **TSH (mIU/L)**; Q2 vs Q1 | 1.41 [0.33,5.95] | 0.75 [0.32,1.75] | 1.12 [0.55,2.29] |
| Q3 vs Q1 | 1.61 [0.29,8.86] | 0.73 [0.31,1.73] | 1.19 [0.49,2.90] |
| Q4 vs Q1 | 1.05 [0.27,4.03] | 0.44 [0.20,0.97]\* | 0.83 [0.40,1.74] |
| p for Trend | 0.943 | 0.105 | 0.609 |
| **T3 (ng/dL)**; Q2 vs Q1 | 1.13 [0.31,4.13] | 1.87 [0.83,4.21] | 3.19 [1.33,7.63]\* |
| Q3 vs Q1 | 3.48 [1.15,10.56]\* | 1.05 [0.30,3.72] | 2.33 [0.93,5.78] |
| Q4 vs Q1 | 2.12 [0.40,11.36] | 1.08 [0.44,2.64] | 4.91 [1.98,12.16]\* |
| p for Trend | 0.153 | 0.989 | 0.023 |
| **FT4 (ng/dL)**; Q2 vs Q1 | 0.42 [0.15,1.19] | 0.87 [0.43,1.75] | 1.25 [0.63,2.47] |
| Q3 vs Q1 | 0.51 [0.16,1.68] | 1.48 [0.70,3.14] | 0.94 [0.50,1.78] |
| Q4 vs Q1 | 0.24 [0.08,0.74]\* | 1.12 [0.46,2.73] | 1.00 [0.48,2.08] |
| p for Trend | 0.027 | 0.894 | 0.759 |

a Hypertensive individuals at baseline were excluded and hypertension status was defined using American College of Cardiology/American Heart Association (ACC/AHA) guidelines

b Model adjusted for age, Hispanic/Latino background, recruitment center, acculturation score-MESA, educational attainment, family history of hypertension, NSAIDs, lipid lowering medications, physical activity level, alcohol consumption, smoking status, AHEI-2010, body mass index, waist to hip ratio, change in BMI, change in waist to hip ratio, total lipids, C-reactive protein, prediabetes status, sleep apnea and chronic kidney disease

c Number of participants transitioning to prehypertension at visit 2 from normotension at visit 1/total number of normotensive participants at visit 1 excluding individuals transitioning to hypertension

d Number of participants transitioning to hypertension at visit 2 from normotension at visit 1/total number of normotensive participants at visit 1 excluding individuals transitioning to prehypertension

e Number of participants transitioning to hypertension at visit 2 from prehypertension at visit 1/total number of prehypertensive participants at visit 1

† Natural log transformed; Q4: quartile 4; Q3: quartile 3; Q2: quartile 2; Q1: quartile 1

\*p<0.05

**Table** **S5.** **Multivariable Poisson regression models for prospective associations of endogenous thyroid-related hormones in quartiles with incident prehypertension and hypertensiona,b among Hispanic/Latino men; N=484**

|  |  |  |  |
| --- | --- | --- | --- |
| **Hormones** | **Normotension at V1 → Prehypertension at V2**  N=53/235c | **Normotension at V1 → Hypertension at V2**  N=89/271d | **Prehypertension at V1 → Hypertension at V2**  N=77/160e |
| **Total; N=484** | **IRR (95% CI)** | **IRR (95% CI)** | **IRR (95% CI)** |
| **TSH (mIU/L)**; Q2 vs Q1 | 0.97 [0.46,2.07] | 1.46 [0.80,2.69] | 0.79 [0.44,1.44] |
| Q3 vs Q1 | 1.37 [0.63,3.00] | 0.78 [0.42,1.48] | 0.84 [0.47,1.51] |
| Q4 vs Q1 | 0.81 [0.32,2.05] | 1.18 [0.60,2.34] | 2.02 [1.17,3.48]\* |
| p for Trend | 0.988 | 0.967 | 0.026 |
| **T3 (ng/dL)**; Q2 vs Q1 | 1.98 [0.95,4.11] | 2.24 [1.16,4.35]\* | 1.95 [1.01,3.77]\* |
| Q3 vs Q1 | 2.47 [1.19,5.11]\* | 2.22 [1.11,4.45]\* | 1.14 [0.58,2.24] |
| Q4 vs Q1 | 1.49 [0.51,4.34] | 1.59 [0.63,4.04] | 2.64 [1.47,4.74]\* |
| p for Trend | 0.097 | 0.222 | 0.007 |
| **FT4 (ng/dL)**; Q2 vs Q1 | 1.19 [0.59,2.40] | 1.52 [0.80,2.89] | 0.82 [0.48,1.39] |
| Q3 vs Q1 | 1.02 [0.44,2.33] | 1.61 [0.82,3.15] | 0.79 [0.47,1.34] |
| Q4 vs Q1 | 1.58 [0.78,3.22] | 1.23 [0.61,2.50] | 1.22 [0.74,2.01] |
| p for Trend | 0.383 | 0.608 | 0.472 |

a Hypertensive individuals at baseline were excluded and hypertension status was defined using American College of Cardiology/American Heart Association (ACC/AHA) guidelines

b Model adjusted for age, Hispanic/Latino background, recruitment center, acculturation score-MESA, educational attainment, family history of hypertension, NSAIDs, lipid lowering medications, physical activity level, alcohol consumption, smoking status, AHEI-2010, body mass index, waist to hip ratio, change in BMI, change in waist to hip ratio, total lipids, C-reactive protein, prediabetes status, sleep apnea and chronic kidney disease

c Number of participants transitioning to prehypertension at visit 2 from normotension at visit 1/total number of normotensive participants at visit 1 excluding individuals transitioning to hypertension

d Number of participants transitioning to hypertension at visit 2 from normotension at visit 1/total number of normotensive participants at visit 1 excluding individuals transitioning to prehypertension

e Number of participants transitioning to hypertension at visit 2 from prehypertension at visit 1/total number of prehypertensive participants at visit 1

† Natural log transformed; Q4: quartile 4; Q3: quartile 3; Q2: quartile 2; Q1: quartile 1

\*p<0.05

**Table** **S6. Multivariable linear regression models for associations of endogenous thyroid-related hormones with change in blood pressure measuresa,b among euthyroid Hispanic/Latino men and postmenopausal women**

|  |  |  |  |
| --- | --- | --- | --- |
| **Hormones** | **Change in SBP**  **(V2-V1)** | **Change in DBP**  **(V2-V1)** | **Change in pulse pressure**  **(V2-V1)** |
| **Postmenopausal women**  **N=610** | **β (95% CI)** | **β (95% CI)** | **β (95% CI)** |
| **TSH (mIU/L)** | -3.68 [-8.49,1.14] | 0.66 [-2.54,3.87] | -4.53 [-7.75,-1.30]\* |
| **T3 (ng/dL)** | 3.33 [1.29,5.36]\* | 1.38 [0.23,2.54]\* | 2.03 [0.58,3.48]\* |
| **FT4 (ng/dL)** | 1.65 [-0.65,3.95] | 1.14 [-0.55,2.83] | 0.37 [-1.34,2.09] |
| **T3/FT4 Ratio** | 0.07 [-0.001,0.15] | 0.02 [-0.03,0.07] | 0.06 [0.01,0.11]\* |
| **TSH/FT4 Ratio** | -1.71 [-3.52,0.11] | -0.09 [-1.19,1.00] | -1.65 [-2.83,-0.46]\* |
| **TSH/T3 Ratio†** | -5.39 [-8.41,-2.37]\* | -1.43 [-3.25,0.39] | -4.06 [-5.95,-2.17]\* |
| **PTFQI** | -1.82 [-6.48,2.83] | 1.16 [-2.42,4.74] | -3.36 [-6.78,0.06] |
| **TFQI** | -0.50 [-1.87,0.88] | 0.38 [-0.68,1.44] | -1.00 [-2.01,0.02] |
| **TSHI** | -1.68 [-3.47,0.10] | -0.14 [-1.45,1.17] | -1.63 [-2.79,-0.47]\* |
| **TT4RI** | -2.24 [-4.72,0.23] | -0.07 [-1.83,1.69] | -2.27 [-3.96,-0.58]\* |
| **Men**  **N=912** |  |  |  |
| **TSH (mIU/L)** | 1.91 [-1.63,5.44] | 1.30 [-0.95,3.55] | 0.56 [-2.00,3.11] |
| **T3 (ng/dL)** | 1.19 [-0.76,3.14] | -0.02 [-1.04,1.00] | 1.32 [0.04,2.60]\* |
| **FT4 (ng/dL)** | -0.18 [-1.93,1.57] | -0.56 [-1.61,0.48] | 0.37 [-0.76,1.51] |
| **T3/FT4 Ratio** | 0.04 [-0.05,0.13] | 0.01 [-0.03,0.06] | 0.03 [-0.02,0.09] |
| **TSH/FT4 Ratio** | 1.11 [-0.85,3.06] | 0.79 [-0.54,2.12] | 0.28 [-1.18,1.74] |
| **TSH/T3 Ratio†** | -0.55 [-3.28,2.18] | 0.20 [-1.57,1.96] | -0.75 [-2.56,1.06] |
| **PTFQI** | -0.37 [-4.90,4.17] | -0.73 [-3.23,1.77] | 0.39 [-2.34,3.12] |
| **TFQI** | -0.15 [-1.70,1.41] | -0.23 [-1.09,0.63] | 0.09 [-0.84,1.03] |
| **TSHI** | 0.02 [-1.77,1.82] | -0.08 [-1.11,0.96] | 0.12 [-0.98,1.22] |
| **TT4RI** | 0.66 [-2.08,3.41] | 0.53 [-1.11,2.18] | 0.15 [-1.71,2.01] |

a Simple constant addition for hypertension medication use: 10mmHg to SBP; 5 mmHg to DBP

b Model adjusted for baseline blood pressure measures, years between visit 1 and 2, age, Hispanic/Latino background, recruitment center, acculturation score-MESA, educational attainment, family history of hypertension, NSAIDs, lipid lowering medications, physical activity level, alcohol consumption, smoking status, AHEI-2010, body mass index, waist to hip ratio, change in BMI, change in waist to hip ratio, total lipids, C-reactive protein, prediabetes status, sleep apnea and chronic kidney disease

Individual continuous hormone concentrations were standardized using the following standard deviations; Postmenopausal women: TSH (0.74 mIU/L), T3 (19.4 ng/dL), FT4 (0.13 ng/dL), PTFQI (0.27), TFQI (0.32), TSHI (0.45) and TT4RI (11.1); Men: TSH (0.80 mIU/L), T3 (19.0 ng/dL), FT4 (0.14 ng/dL), PTFQI (0.33), TFQI (0.35), TSHI (0.52) and TT4RI (12.1); ratios were not standardized

† Natural log transformed

\*p<0.05

**Table S7. Multivariable linear regression models for prospective associations of endogenous thyroid-related hormones in quartiles with change in blood pressure measuresa,b among euthyroid Hispanic/Latino men and postmenopausal women**

|  |  |  |  |
| --- | --- | --- | --- |
| **Hormones** | **Change in SBP**  **(V2-V1)** | **Change in DBP**  **(V2-V1)** | **Change in pulse pressure**  **(V2-V1)** |
| **Postmenopausal women**  **N=610** | **β (95% CI)** | **β (95% CI)** | **β (95% CI)** |
| **TSH (mIU/L)**; Q2 vs Q1 | 0.52 [-3.03,4.07] | 1.82 [-0.15,3.79] | -1.12 [-3.63,1.40] |
| Q3 vs Q1 | -1.18 [-5.17,2.81] | 0.84 [-1.51,3.20] | -2.07 [-4.98,0.83] |
| Q4 vs Q1 | -0.82 [-5.13,3.48] | 2.48 [-0.64,5.60] | -3.42 [-6.11,-0.73]\* |
| p for Trend | 0.514 | 0.215 | 0.017 |
| **T3 (ng/dL)**; Q2 vs Q1 | 1.90 [-2.26,6.06] | 0.73 [-1.78,3.24] | 0.99 [-2.10,4.08] |
| Q3 vs Q1 | 3.84 [0.16,7.52]\* | 2.01 [-0.40,4.42] | 1.92 [-0.97,4.81] |
| Q4 vs Q1 | 6.68 [2.62,10.75]\* | 2.43 [-0.02,4.89] | 4.35 [1.29,7.41]\* |
| p for Trend | 0.001 | 0.033 | 0.004 |
| **FT4 (ng/dL)**; Q2 vs Q1 | -0.29 [-4.76,4.18] | 0.66 [-1.55,2.88] | -0.96 [-4.63,2.70] |
| Q3 vs Q1 | 1.05 [-3.75,5.85] | 1.72 [-0.92,4.36] | -0.90 [-4.70,2.91] |
| Q4 vs Q1 | 2.07 [-2.22,6.37] | 2.19 [-0.57,4.95] | -0.37 [-3.96,3.22] |
| p for Trend | 0.181 | 0.098 | 0.995 |
| **Men**  **N=912** |  |  |  |
| **TSH (mIU/L)**; Q2 vs Q1 | -4.03 [-8.10,0.04] | -2.45 [-4.50,-0.40]\* | -1.56 [-4.33,1.22] |
| Q3 vs Q1 | -1.07 [-4.50,2.36] | -0.97 [-3.01,1.08] | -0.08 [-2.42,2.27] |
| Q4 vs Q1 | 0.80 [-3.53,5.13] | -0.19 [-2.88,2.51] | 0.90 [-2.27,4.06] |
| p for Trend | 0.517 | 0.929 | 0.436 |
| **T3 (ng/dL)**; Q2 vs Q1 | 3.63 [-0.44,7.71] | 0.42 [-1.80,2.64] | 3.33 [0.66,6.00]\* |
| Q3 vs Q1 | 2.74 [-1.27,6.75] | -1.26 [-3.63,1.10] | 4.02 [1.32,6.72]\* |
| Q4 vs Q1 | 2.75 [-1.54,7.04] | -0.49 [-2.83,1.86] | 3.50 [0.63,6.38]\* |
| p for Trend | 0.271 | 0.379 | 0.014 |
| **FT4 (ng/dL)**; Q2 vs Q1 | 0.51 [-3.17,4.19] | 1.14 [-1.12,3.41] | -0.69 [-3.28,1.90] |
| Q3 vs Q1 | -1.66 [-5.66,2.34] | -0.003 [-2.34,2.34] | -1.60 [-4.26,1.06] |
| Q4 vs Q1 | -0.63 [-4.53,3.27] | -0.77 [-3.20,1.67] | 0.12 [-2.48,2.72] |
| p for Trend | 0.449 | 0.249 | 0.939 |

a Hypertensive individuals at baseline were excluded and hypertension status was defined using ACC/AHA guidelines

b Model adjusted for age, Hispanic/Latino background, recruitment center, acculturation score-MESA, educational attainment, family history of hypertension, NSAIDs, lipid lowering medications, physical activity level, alcohol consumption, smoking status, AHEI-2010, body mass index, waist to hip ratio, change in BMI, change in waist to hip ratio, total lipids, C-reactive protein, prediabetes status, sleep apnea and chronic kidney disease

† Natural log transformed; Q4: quartile 4; Q3: quartile 3; Q2: quartile 2; Q1: quartile 1

\*p<0.05

**Table S8. Multivariable Poisson regression models for prospective associations of endogenous thyroid-related hormones with incident prehypertension and hypertensiona,b among euthyroid Hispanic/Latino postmenopausal women; N=268**

|  |  |  |  |
| --- | --- | --- | --- |
| **Hormones** | **Normotension at V1 → Prehypertension at V2**  N=26/134c | **Normotension at V1 → Hypertension at V2**  N=47/155d | **Prehypertension at V1 → Hypertension at V2**  N=51/87e |
| **Total; N=268** | **IRR (95% CI)** | **IRR (95% CI)** | **IRR (95% CI)** |
| **TSH (mIU/L)** | unstable estimates | 0.31 [0.09,1.11] | 0.45 [0.17,1.17] |
| **T3 (ng/dL)** | unstable estimates | 0.75 [0.45,1.23] | 1.44 [1.04,2.00]\* |
| **Free T4 (ng/dL)** | unstable estimates | 1.23 [0.55,2.73] | 0.89 [0.58,1.37] |
| **T3/Free T4 Ratio** | unstable estimates | 0.99 [0.97,1.01] | 1.01 [0.99,1.03] |
| **TSH/Free T4 Ratio** | unstable estimates | 0.67 [0.41,1.10] | 0.77 [0.52,1.13] |
| **TSH/T3 Ratio†** | unstable estimates | 0.68 [0.38,1.23] | 0.64 [0.41,1.01] |
| **PTFQI** | unstable estimates | 0.46 [0.12,1.77] | 0.52 [0.25,1.09] |
| **TFQI** | unstable estimates | 0.77 [0.52,1.16] | 0.83 [0.67,1.03] |
| **TSHI** | unstable estimates | 0.72 [0.48,1.10] | 0.80 [0.61,1.05] |
| **TT4RI** | unstable estimates | 0.53 [0.28,1.04] | 0.69 [0.44,1.07] |

a Hypertensive individuals at baseline were excluded and hypertension status was defined using ACC/AHA guidelines

b Model adjusted for age, Hispanic/Latino background, recruitment center, acculturation score-MESA, educational attainment, family history of hypertension, NSAIDs, lipid lowering medications, physical activity level, alcohol consumption, smoking status, AHEI-2010, body mass index, waist to hip ratio, change in BMI, change in waist to hip ratio, total lipids, C-reactive protein, prediabetes status, sleep apnea and chronic kidney disease

c Number of participants transitioning to prehypertension at visit 2 from normotension at visit 1/total number of normotensive participants at visit 1 excluding individuals transitioning to hypertension

d Number of participants transitioning to hypertension at visit 2 from normotension at visit 1/total number of normotensive participants at visit 1 excluding individuals transitioning to prehypertension

e Number of participants transitioning to hypertension at visit 2 from prehypertension at visit 1/total number of prehypertensive participants at visit 1

Individual continuous hormone concentrations were standardized using the following standard deviations; Postmenopausal women: TSH (0.74 mIU/L), T3 (19.4 ng/dL), FT4 (0.13 ng/dL), PTFQI (0.27), TFQI (0.32), TSHI (0.45) and TT4RI (11.1); Men: TSH (0.80 mIU/L), T3 (19.0 ng/dL), FT4 (0.14 ng/dL), PTFQI (0.33), TFQI (0.35), TSHI (0.52) and TT4RI (12.1); ratios were not standardized

† Natural log transformed

\*p<0.05

**Table S9. Multivariable Poisson regression models for prospective associations of endogenous thyroid-related hormones in quartiles with incident prehypertension and hypertensiona,b among euthyroid Hispanic/Latino postmenopausal women; N=268**

|  |  |  |  |
| --- | --- | --- | --- |
| **Hormones** | **Normotension at V1 → Prehypertension at V2**  N=26/134c | **Normotension at V1 → Hypertension at V2**  N=47/155d | **Prehypertension at V1 → Hypertension at V2**  N=51/87e |
| **Total; N=268** | **IRR (95% CI)** | **IRR (95% CI)** | **IRR (95% CI)** |
| **TSH (mIU/L)**; Q2 vs Q1 | unstable estimates | 0.71 [0.25,1.99] | 1.05 [0.55,1.99] |
| Q3 vs Q1 | unstable estimates | 0.64 [0.23,1.80] | 1.06 [0.50,2.25] |
| Q4 vs Q1 | unstable estimates | 0.33 [0.10,1.14] | 0.60 [0.23,1.57] |
| p for Trend | - | 0.128 | 0.469 |
| **T3 (ng/dL)**; Q2 vs Q1 | unstable estimates | 1.46 [0.55,3.88] | 3.33 [1.15,9.66]\* |
| Q3 vs Q1 | unstable estimates | 0.83 [0.20,3.51] | 2.35 [0.82,6.72] |
| Q4 vs Q1 | unstable estimates | 1.10 [0.34,3.61] | 4.33 [1.51,12.45]\* |
| p for Trend | - | 0.958 | 0.095 |
| **FT4 (ng/dL)**; Q2 vs Q1 | unstable estimates | 0.72 [0.31,1.67] | 0.61 [0.28,1.34] |
| Q3 vs Q1 | unstable estimates | 1.04 [0.38,2.81] | 0.54 [0.26,1.16] |
| Q4 vs Q1 | unstable estimates | 1.08 [0.34,3.43] | 0.56 [0.27,1.17] |
| p for Trend | - | 0.912 | 0.181 |

a Hypertensive individuals at baseline were excluded and hypertension status was defined using ACC/AHA guidelines

b Model adjusted for age, Hispanic/Latino background, recruitment center, acculturation score-MESA, educational attainment, family history of hypertension, NSAIDs, lipid lowering medications, physical activity level, alcohol consumption, smoking status, AHEI-2010, body mass index, waist to hip ratio, change in BMI, change in waist to hip ratio, total lipids, C-reactive protein, prediabetes status, sleep apnea and chronic kidney disease

c Number of participants transitioning to prehypertension at visit 2 from normotension at visit 1/total number of normotensive participants at visit 1 excluding individuals transitioning to hypertension

d Number of participants transitioning to hypertension at visit 2 from normotension at visit 1/total number of normotensive participants at visit 1 excluding individuals transitioning to prehypertension

e Number of participants transitioning to hypertension at visit 2 from prehypertension at visit 1/total number of prehypertensive participants at visit 1

† Natural log transformed; Q4: quartile 4; Q3: quartile 3; Q2: quartile 2; Q1: quartile 1

\*p<0.05

**Table** **S10. Multivariable Poisson regression models for prospective associations of endogenous thyroid-related hormones with incident prehypertension and hypertensiona,b among euthyroid Hispanic/Latino men; N=407**

|  |  |  |  |
| --- | --- | --- | --- |
| **Hormones** | **Normotension at V1 → Prehypertension at V2**  N=48/199c | **Normotension at V1 → Hypertension at V2**  N=77/228d | **Prehypertension at V1 → Hypertension at V2**  N=61/131e |
| **Total; N=407** | **IRR (95% CI)** | **IRR (95% CI)** | **IRR (95% CI)** |
| **TSH (mIU/L)** | 1.55 [0.77,3.11] | 1.39 [0.77,2.52] | 1.54 [0.91,2.60] |
| **T3 (ng/dL)** | 1.39 [0.93,2.08] | 1.16 [0.84,1.60] | 1.16 [0.88,1.55] |
| **Free T4 (ng/dL)** | 1.20 [0.82,1.76] | 0.98 [0.73,1.33] | 1.10 [0.87,1.39] |
| **T3/Free T4 Ratio** | 1.01 [0.99,1.02] | 1.00 [0.99,1.02] | 1.00 [0.99,1.01] |
| **TSH/Free T4 Ratio** | 1.25 [0.86,1.81] | 1.15 [0.84,1.57] | 1.27 [0.94,1.73] |
| **TSH/T3 Ratio†** | 0.98 [0.45,2.14] | 1.33 [0.76,2.32] | 1.05 [0.65,1.70] |
| **PTFQI** | 1.60 [0.49,5.19] | 1.23 [0.55,2.78] | 1.00 [0.55,1.82] |
| **TFQI** | 1.17 [0.79,1.74] | 1.12 [0.85,1.48] | 0.98 [0.80,1.21] |
| **TSHI** | 1.19 [0.72,1.98] | 1.16 [0.84,1.61] | 1.08 [0.87,1.35] |
| **TT4RI** | 1.37 [0.63,2.97] | 1.47 [0.87,2.50] | 1.15 [0.79,1.68] |

a Hypertensive individuals at baseline were excluded and hypertension status was defined using ACC/AHA guidelines

b Model adjusted for age, Hispanic/Latino background, recruitment center, acculturation score-MESA, educational attainment, family history of hypertension, NSAIDs, lipid lowering medications, physical activity level, alcohol consumption, smoking status, AHEI-2010, body mass index, waist to hip ratio, change in BMI, change in waist to hip ratio, total lipids, C-reactive protein, prediabetes status, sleep apnea and chronic kidney disease

c Number of participants transitioning to prehypertension at visit 2 from normotension at visit 1/total number of normotensive participants at visit 1 excluding individuals transitioning to hypertension

d Number of participants transitioning to hypertension at visit 2 from normotension at visit 1/total number of normotensive participants at visit 1 excluding individuals transitioning to prehypertension

e Number of participants transitioning to hypertension at visit 2 from prehypertension at visit 1/total number of prehypertensive participants at visit 1

Individual continuous hormone concentrations were standardized using the following standard deviations; Postmenopausal women: TSH (0.74 mIU/L), T3 (19.4 ng/dL), FT4 (0.13 ng/dL), PTFQI (0.27), TFQI (0.32), TSHI (0.45) and TT4RI (11.1); Men: TSH (0.80 mIU/L), T3 (19.0 ng/dL), FT4 (0.14 ng/dL), PTFQI (0.33), TFQI (0.35), TSHI (0.52) and TT4RI (12.1); ratios were not standardized

† Natural log transformed

\*p<0.05

**Table S11. Multivariable Poisson regression models for prospective associations of endogenous thyroid-related hormones with incident prehypertension and hypertensiona,b among euthyroid Hispanic/Latino men; N=407**

|  |  |  |  |
| --- | --- | --- | --- |
| **Hormones** | **Normotension at V1 → Prehypertension at V2**  N=48/199c | **Normotension at V1 → Hypertension at V2**  N=77/228d | **Prehypertension at V1 → Hypertension at V2**  N=61/131e |
| **Total; N=407** | **IRR (95% CI)** | **IRR (95% CI)** | **IRR (95% CI)** |
| **TSH (mIU/L)**; Q2 vs Q1 | 0.95 [0.39,2.28] | 1.51 [0.79,2.90] | 0.85 [0.45,1.58] |
| Q3 vs Q1 | 1.44 [0.67,3.10] | 0.89 [0.45,1.77] | 0.92 [0.49,1.73] |
| Q4 vs Q1 | 1.11 [0.43,2.91] | 1.81 [0.89,3.68] | 1.29 [0.62,2.68] |
| p for Trend | 0.444 | 0.143 | 0.683 |
| **T3 (ng/dL)**; Q2 vs Q1 | 1.89 [0.87,4.11] | 2.18 [1.08,4.39]\* | 1.56 [0.73,3.35] |
| Q3 vs Q1 | 2.27 [1.04,4.96]\* | 2.28 [1.07,4.85]\* | 0.96 [0.47,1.96] |
| Q4 vs Q1 | 1.95 [0.63,6.04] | 1.63 [0.59,4.47] | 2.00 [0.96,4.16] |
| p for Trend | 0.068 | 0.052 | 0.227 |
| **FT4 (ng/dL)**; Q2 vs Q1 | 0.97 [0.45,2.12] | 1.60 [0.76,3.35] | 0.76 [0.40,1.45] |
| Q3 vs Q1 | 0.80 [0.32,2.01] | 1.64 [0.77,3.49] | 0.86 [0.50,1.49] |
| Q4 vs Q1 | 1.76 [0.80,3.88] | 1.38 [0.60,3.20] | 1.04 [0.56,1.94] |
| p for Trend | 0.297 | 0.850 | 0.741 |

a Hypertensive individuals at baseline were excluded and hypertension status was defined using ACC/AHA guidelines

b Model adjusted for age, Hispanic/Latino background, recruitment center, acculturation score-MESA, educational attainment, family history of hypertension, NSAIDs, lipid lowering medications, physical activity level, alcohol consumption, smoking status, AHEI-2010, body mass index, waist to hip ratio, change in BMI, change in waist to hip ratio, total lipids, C-reactive protein, prediabetes status, sleep apnea and chronic kidney disease

c Number of participants transitioning to prehypertension at visit 2 from normotension at visit 1/total number of normotensive participants at visit 1 excluding individuals transitioning to hypertension

d Number of participants transitioning to hypertension at visit 2 from normotension at visit 1/total number of normotensive participants at visit 1 excluding individuals transitioning to prehypertension

e Number of participants transitioning to hypertension at visit 2 from prehypertension at visit 1/total number of prehypertensive participants at visit 1

† Natural log transformed; Q4: quartile 4; Q3: quartile 3; Q2: quartile 2; Q1: quartile 1

\*p<0.05