| Parameter | Non-viscerally obese (818) | | | Viscerally obese (269) | | | P-value |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ***E0/E1(434)*** | ***>E1 (384)*** | ***P-value*** | ***E0/E1 (22)*** | ***>E1 (247)*** | ***P-value*** |
| Fibrosis [kPa] | 4.40 (3.60 - 5.30) | 4.80 (4.00 - 5.80) | < 0.0001 | 4.60 (3.92 - 5.27) | 5.70 (4.60 - 7.25) | 0.003 | < 0.0001 |
| Steatosis [dB/m] | 202.00 (181.00 - 219.00) | 276.00 (257.00 - 305.00) | < 0.0001 | 218.50 (194.00 - 228.00) | 318.00 (287.50 - 353.00) | < 0.0001 | < 0.0001 |
| Trunk fat [%] |  |  | < 0.0001 |  |  | 0.85 | < 0.0001 |
| Median (IQR) | 27.00 (20.90 - 33.50) | 33.95 (28.22 - 40.00) |  | 35.90 (30.90 - 44.60) | 36.20 (31.55 - 42.30) |  |  |
| Missing | 19 (4.38%) | 26 (6.77%) |  | 5 (22.73%) | 44 (17.81%) |  |  |
| Total fat [%] | 29.80 (23.10 - 36.18) | 35.30 (28.00 - 41.30) | < 0.0001 | 38.00 (32.25 - 46.42) | 35.90 (30.75 - 44.40) | 0.34 | < 0.0001 |
| CPR |  |  | < 0.0001 |  |  | 0.66 | < 0.0001 |
| Median (IQR) | 1.00 (0.56 - 2.18) | 1.69 (0.84 - 3.76) |  | 4.13 (1.76 - 6.53) | 3.31 (1.71 - 5.96) |  |  |
| Missing | 0 (0%) | 4 (1.04%) |  | 0 (0%) | 0 (0%) |  |  |
| Total cholesterol [mg/dL] |  |  | < 0.0001 |  |  | 0.30 | < 0.0001 |
| Median (IQR) | 174.00 (153.00 - 201.00) | 188.00 (162.00 - 214.50) |  | 200.00 (186.00 - 227.50) | 191.00 (169.00 - 216.50) |  |  |
| Missing | 0 (0%) | 1 (0.26%) |  | 0 (0%) | 0 (0%) |  |  |
| cHDL [%] |  |  | < 0.0001 |  |  | 0.025 | < 0.0001 |
| Median (IQR) | 56.00 (48.00 - 65.75) | 50.00 (42.00 - 59.00) |  | 47.00 (43.25 - 54.50) | 43.00 (37.50 - 50.00) |  |  |
| Missing | 0 (0%) | 1 (0.26%) |  | 0 (0%) | 0 (0%) |  |  |
| Glycohemoglobin [%] |  |  | < 0.0001 |  |  | 0.009 | < 0.0001 |
| Median (IQR) | 5.30 (5.10 - 5.50) | 5.40 (5.15 - 5.70) |  | 5.45 (5.30 - 5.77) | 5.80 (5.50 - 6.30) |  |  |
| Missing | 1 (0.23%) | 1 (0.26%) |  | 0 (0%) | 0 (0%) |  |  |
| GGT |  |  | < 0.0001 |  |  | 0.22 | < 0.0001 |
| Median (IQR) | 16.00 (12.00 - 22.00) | 21.00 (15.00 - 32.25) |  | 23.50 (18.25 - 36.50) | 28.00 (20.00 - 45.00) |  |  |
| Missing | 0 (0%) | 0 (0%) |  | 0 (0%) | 1 (0.40%) |  |  |
| ALT |  |  | < 0.0001 |  |  | 0.0008 | < 0.0001 |
| Median (IQR) | 15.00 (11.00 - 21.00) | 19.00 (13.75 - 29.00) |  | 16.00 (13.00 - 22.25) | 25.00 (17.00 - 36.75) |  |  |
| Missing | 0 (0%) | 0 (0%) |  | 0 (0%) | 1 (0.40%) |  |  |
| Albumin [mg/dL] | 4.10 (3.90 - 4.40) | 4.10 (3.80 - 4.30) | 0.004 | 3.90 (3.70 - 4.00) | 4.00 (3.80 - 4.20) | 0.091 | < 0.0001 |
| AST |  |  | 0.090 |  |  | 0.087 | 0.001 |
| Median (IQR) | 18.00 (15.00 - 22.00) | 18.00 (16.00 - 23.00) |  | 17.50 (16.00 - 21.00) | 20.00 (16.00 - 27.00) |  |  |
| Missing | 2 (0.46%) | 1 (0.26%) |  | 0 (0%) | 2 (0.81%) |  |  |
| Creatinine [mg/dL] | 0.83 (0.70 - 0.95) | 0.78 (0.66 - 0.93) | 0.003 | 0.82 (0.67 - 0.93) | 0.83 (0.69 - 0.96) | 0.60 | 0.27 |
| Bilirubin [mg/dL] | 0.40 (0.30 - 0.60) | 0.40 (0.30 - 0.60) | 0.007 | 0.40 (0.30 - 0.57) | 0.40 (0.30 - 0.60) | 0.82 | 0.91 |
| Triglycerides [mg/dL] | 77.50 (60.00 - 105.00) | 109.50 (75.75 - 165.25) | < 0.0001 | 131.00 (99.25 - 169.00) | 139.00 (100.00 - 199.50) | 0.42 | < 0.0001 |
| Uric acid [mg/dL] | 4.70 (4.00 - 5.80) | 5.20 (4.30 - 6.30) | < 0.0001 | 5.25 (4.60 - 6.25) | 5.70 (4.80 - 6.90) | 0.16 | < 0.0001 |
| Insulin [uU/mL] |  |  | < 0.0001 |  |  | 0.048 | < 0.0001 |
| Median (IQR) | 6.41 (4.34 - 9.40) | 10.01 (6.54 - 15.59) |  | 11.76 (8.63 - 17.89) | 16.65 (10.27 - 24.86) |  |  |
| Missing | 0 (0%) | 5 (1.30%) |  | 0 (0%) | 0 (0%) |  |  |
| Glucose [mg/dL] |  |  | < 0.0001 |  |  | 0.025 | < 0.0001 |
| Median (IQR) | 97.00 (92.00 - 102.00) | 101.50 (96.00 - 109.00) |  | 104.00 (99.00 - 110.75) | 110.00 (102.00 - 126.50) |  |  |
| Missing | 0 (0%) | 2 (0.52%) |  | 0 (0%) | 0 (0%) |  |  |
| Diabetes [%] |  |  | 1.0 |  |  | 1.0 | 1.0 |
| Non-diabetic | 4 (0.92%) | 28 (7.29%) |  | 3 (13.64%) | 51 (20.65%) |  |  |
| Diabetic | 0 (0.00%) | 0 (0.00%) |  | 0 (0.00%) | 0 (0.00%) |  |  |
| Missing | 430 (99.08%) | 356 (92.71%) |  | 19 (86.36%) | 196 (79.35%) |  |  |
| Total calories |  |  | 0.24 |  |  | 0.54 | 0.13 |
| Median (IQR) | 1884.00 (1311.00 - 2436.00) | 1802.50 (1230.50 - 2352.75) |  | 1585.00 (1283.25 - 2602.50) | 1880.00 (1453.50 - 2552.50) |  |  |
| Missing | 69 (15.90%) | 54 (14.06%) |  | 6 (27.27%) | 44 (17.81%) |  |  |
| Protein [g] |  |  | 0.19 |  |  | 0.21 | 0.20 |
| Median (IQR) | 71.85 (50.20 - 97.66) | 66.98 (46.71 - 93.33) |  | 54.77 (45.21 - 84.73) | 73.72 (51.69 - 104.88) |  |  |
| Missing | 69 (15.90%) | 54 (14.06%) |  | 6 (27.27%) | 44 (17.81%) |  |  |
| Carbohydrates [g] |  |  | 0.45 |  |  | 0.51 | 0.10 |
| Median (IQR) | 214.31 (147.04 - 296.89) | 209.95 (140.43 - 293.23) |  | 210.58 (150.64 - 261.98) | 230.15 (160.38 - 310.07) |  |  |
| Missing | 69 (15.90%) | 54 (14.06%) |  | 6 (27.27%) | 44 (17.81%) |  |  |
| Sugar [g] |  |  | 0.30 |  |  | 0.56 | 0.39 |
| Median (IQR) | 81.48 (50.46 - 127.98) | 76.31 (41.23 - 131.99) |  | 99.77 (74.29 - 138.81) | 90.64 (52.13 - 139.22) |  |  |
| Missing | 69 (15.90%) | 54 (14.06%) |  | 6 (27.27%) | 44 (17.81%) |  |  |
| Fiber [g] |  |  | 1.00 |  |  | 0.17 | 0.42 |
| Median (IQR) | 13.60 (8.10 - 20.60) | 13.35 (8.60 - 20.67) |  | 10.95 (7.80 - 18.20) | 13.50 (8.95 - 22.10) |  |  |
| Missing | 69 (15.90%) | 54 (14.06%) |  | 6 (27.27%) | 44 (17.81%) |  |  |
| Total fat [g] |  |  | 0.44 |  |  | 0.98 | 0.077 |
| Median (IQR) | 69.61 (46.46 - 99.31) | 67.46 (44.60 - 96.19) |  | 71.31 (52.97 - 106.48) | 71.85 (53.82 - 105.15) |  |  |
| Missing | 69 (15.90%) | 54 (14.06%) |  | 6 (27.27%) | 44 (17.81%) |  |  |
| Saturated fat [g] |  |  | 0.95 |  |  | 0.96 | 0.012 |
| Median (IQR) | 21.35 (12.35 - 32.06) | 21.23 (12.92 - 32.19) |  | 22.58 (18.04 - 33.25) | 24.31 (16.03 - 35.01) |  |  |
| Missing | 69 (15.90%) | 54 (14.06%) |  | 6 (27.27%) | 44 (17.81%) |  |  |
| Monounsaturated fat [g] |  |  | 0.21 |  |  | 0.89 | 0.21 |
| Median (IQR) | 24.13 (15.24 - 34.65) | 22.46 (14.91 - 32.33) |  | 26.01 (18.33 - 35.40) | 24.49 (16.96 - 35.14) |  |  |
| Missing | 69 (15.90%) | 54 (14.06%) |  | 6 (27.27%) | 44 (17.81%) |  |  |
| Polyunsaturated fat [g] |  |  | 0.50 |  |  | 0.56 | 0.51 |
| Median (IQR) | 15.29 (9.64 - 24.84) | 15.48 (9.68 - 21.99) |  | 15.03 (9.21 - 19.19) | 16.60 (9.92 - 23.86) |  |  |
| Missing | 69 (15.90%) | 54 (14.06%) |  | 6 (27.27%) | 44 (17.81%) |  |  |
| Cholesterol [g] |  |  | 0.91 |  |  | 0.97 | 0.038 |
| Median (IQR) | 225.00 (120.00 - 371.00) | 215.50 (115.50 - 374.75) |  | 232.50 (175.00 - 374.00) | 229.00 (139.50 - 461.50) |  |  |
| Missing | 69 (15.90%) | 54 (14.06%) |  | 6 (27.27%) | 44 (17.81%) |  |  |
| Male [%] | 197 (45.39%) | 166 (43.23%) | 0.57 | 11 (50.00%) | 147 (59.51%) | 0.50 | < 0.0001 |
| Age [years] | 32.00 (24.00 - 44.00) | 38.00 (28.00 - 49.00) | < 0.0001 | 45.50 (39.75 - 52.00) | 47.00 (41.00 - 54.00) | 0.88 | < 0.0001 |
| BMI |  |  | < 0.0001 |  |  | 0.18 | < 0.0001 |
| Median (IQR) | 24.24 (21.60 - 26.96) | 27.56 (24.88 - 31.15) |  | 33.03 (31.08 - 37.63) | 35.25 (31.29 - 40.02) |  |  |
| Missing | 2 (0.46%) | 5 (1.30%) |  | 0 (0%) | 0 (0%) |  |  |
| METS-IR |  |  | < 0.0001 |  |  | 0.011 | < 0.0001 |
| Median (IQR) | 33.83 (29.30 - 39.16) | 41.95 (36.24 - 46.60) |  | 49.22 (44.74 - 59.10) | 56.09 (50.16 - 62.74) |  |  |
| Missing | 2 (0.46%) | 8 (2.08%) |  | 0 (0%) | 0 (0%) |  |  |
| WHR |  |  | < 0.0001 |  |  | 0.34 | < 0.0001 |
| Median (IQR) | 0.50 (0.46 - 0.55) | 0.57 (0.53 - 0.62) |  | 0.65 (0.64 - 0.71) | 0.68 (0.62 - 0.75) |  |  |
| Missing | 5 (1.15%) | 9 (2.34%) |  | 0 (0%) | 0 (0%) |  |  |
| METS-VF |  |  | < 0.0001 |  |  | 0.003 | < 0.0001 |
| Median (IQR) | 6.12 (5.53 - 6.61) | 6.78 (6.46 - 7.00) |  | 7.26 (7.22 - 7.38) | 7.39 (7.29 - 7.55) |  |  |
| Missing | 5 (1.15%) | 12 (3.12%) |  | 0 (0%) | 0 (0%) |  |  |
| FLI |  |  | < 0.0001 |  |  | 0.060 | < 0.0001 |
| Median (IQR) | 15.31 (6.38 - 35.55) | 49.87 (27.14 - 70.63) |  | 86.26 (76.32 - 92.75) | 92.54 (82.01 - 97.08) |  |  |
| Missing | 5 (1.15%) | 9 (2.34%) |  | 0 (0%) | 1 (0.40%) |  |  |
| AST/ALT |  |  | < 0.0001 |  |  | < 0.0001 | < 0.0001 |
| Median (IQR) | 1.22 (1.00 - 1.45) | 1.00 (0.78 - 1.25) |  | 1.06 (0.98 - 1.28) | 0.82 (0.67 - 1.00) |  |  |
| Missing | 2 (0.46%) | 1 (0.26%) |  | 0 (0%) | 2 (0.81%) |  |  |

Table 1. Population characteristics of studied cohort.

|  | STEATOSIS | | | | | FIBROSIS | | | | | FLI | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Adiposity proxy | Parameter | β | SE | p-value | 95% CI | Parameter | β | SE | p-value | 95% CI | Parameter | β | SE | p-value | 95% CI |
| 1-METS-VF | Proxy | 1.540 | 0.088 | <0.001 | 1.367 - 1.712 | Proxy | 1.149 | 0.149 | <0.001 | 0.857 - 1.441 | Proxy | 4.268 | 0.218 | <0.001 | 3.839 - 4.697 |
| SUA | 0.290 | 0.075 | <0.001 | 0.144 - 0.437 | SUA | 0.191 | 0.139 | 0.17 | -0.081 - 0.463 | SUA | 0.439 | 0.097 | <0.001 | 0.248 - 0.63 |
| Intercepts | E0-E1 | -0.497 | 0.074 | <0.001 | -0.642 - -0.352 | F0-F1 | -7.014 | 0.742 | <0.001 | -8.471 - -5.557 | FLI0-FLI1 | -2.569 | 0.157 | <0.001 | -2.876 - -2.261 |
| E1-E2 | 0.227 | 0.073 | <0.001 | 0.085 - 0.37 | F1-F2 | 2.416 | 0.452 | <0.001 | 1.529 - 3.304 | FLI1-FLI2 | 1.096 | 0.119 | <0.001 | 0.862 - 1.33 |
| E2-E3 | 1.262 | 0.082 | <0.001 | 1.1 - 1.423 | F2-F3 | 3.735 | 0.478 | <0.001 | 2.797 - 4.673 |  |  |  |  |  |
|  |  |  |  |  | F3-F4 | 4.437 | 0.511 | <0.001 | 3.434 - 5.44 |  |  |  |  |  |
| 2-Interaction WHR\* Total fat | Proxy | -0.277 | 0.092 | <0.001 | -0.457 - -0.097 | Proxy | 0.262 | 0.121 | 0.03 | 0.024 - 0.5 | Proxy | -0.267 | 0.203 | 0.19 | -0.671 - 0.138 |
| SUA | 0.241 | 0.080 | <0.001 | 0.084 - 0.398 | SUA | 0.102 | 0.147 | 0.49 | -0.186 - 0.391 | SUA | 0.382 | 0.112 | <0.001 | 0.161 - 0.602 |
| Intercepts | E0-E1 | 14.616 | 1.955 | <0.001 | 10.773 - 18.458 | F0-F1 | -5.438 | 2.701 | 0.04 | -10.739 - -0.138 | FLI0-FLI1 | 31.345 | 4.115 | <0.001 | 23.145 - 39.546 |
| E1-E2 | 15.335 | 1.962 | <0.001 | 11.479 - 19.192 | F1-F2 | 4.011 | 2.663 | 0.13 | -1.214 - 9.237 | FLI1-FLI2 | 35.387 | 4.218 | <0.001 | 26.973 - 43.8 |
| E2-E3 | 16.355 | 1.969 | <0.001 | 12.483 - 20.226 | F2-F3 | 5.360 | 2.668 | 0.04 | 0.124 - 10.596 |  |  |  |  |  |
|  |  |  |  |  | F3-F4 | 6.073 | 2.674 | 0.02 | 0.824 - 11.322 |  |  |  |  |  |
| 3-WHR | Proxy | 13.667 | 0.872 | <0.001 | 11.954 - 15.38 | Proxy | 10.421 | 1.260 | <0.001 | 7.947 - 12.895 | Proxy | 49.237 | 2.554 | <0.001 | 44.217 - 54.257 |
| SUA | 0.253 | 0.079 | <0.001 | 0.098 - 0.409 | SUA | 0.093 | 0.146 | 0.52 | -0.192 - 0.379 | SUA | 0.405 | 0.113 | <0.001 | 0.183 - 0.628 |
| Intercepts | E0-E1 | 8.944 | 0.553 | <0.001 | 7.859 - 10.029 | F0-F1 | 0.824 | 0.932 | 0.38 | -1.006 - 2.654 | FLI0-FLI1 | 26.845 | 1.420 | <0.001 | 24.054 - 29.637 |
| E1-E2 | 9.656 | 0.565 | <0.001 | 8.548 - 10.765 | F1-F2 | 10.315 | 0.955 | <0.001 | 8.441 - 12.189 | FLI1-FLI2 | 30.880 | 1.598 | <0.001 | 27.736 - 34.025 |
| E2-E3 | 10.676 | 0.583 | <0.001 | 9.531 - 11.821 | F2-F3 | 11.649 | 0.987 | <0.001 | 9.714 - 13.585 |  |  |  |  |  |
|  |  |  |  |  | F3-F4 | 12.359 | 1.008 | <0.001 | 10.38 - 14.338 |  |  |  |  |  |
| 4-BMI | Proxy | 0.188 | 0.012 | <0.001 | 0.164 - 0.212 | Proxy | 0.141 | 0.017 | <0.001 | 0.108 - 0.174 | Proxy | 0.677 | 0.036 | <0.001 | 0.607 - 0.748 |
| SUA | 0.297 | 0.078 | <0.001 | 0.144 - 0.449 | SUA | 0.118 | 0.144 | 0.41 | -0.165 - 0.4 | SUA | 0.460 | 0.109 | <0.001 | 0.247 - 0.674 |
| Intercepts | E0-E1 | 6.991 | 0.444 | <0.001 | 6.12 - 7.862 | F0-F1 | -0.602 | 0.821 | 0.46 | -2.213 - 1.009 | FLI0-FLI1 | 19.790 | 1.092 | <0.001 | 17.636 - 21.945 |
| E1-E2 | 7.691 | 0.454 | <0.001 | 6.799 - 8.583 | F1-F2 | 8.845 | 0.800 | <0.001 | 7.275 - 10.416 | FLI1-FLI2 | 23.531 | 1.239 | <0.001 | 21.089 - 25.974 |
| E2-E3 | 8.700 | 0.472 | <0.001 | 7.774 - 9.625 | F2-F3 | 10.180 | 0.834 | <0.001 | 8.544 - 11.817 |  |  |  |  |  |
|  |  |  |  |  | F3-F4 | 10.892 | 0.859 | <0.001 | 9.207 - 12.577 |  |  |  |  |  |
| 5-Trunk fat | Proxy | 0.167 | 0.011 | <0.001 | 0.145 - 0.189 | Proxy | 0.096 | 0.019 | <0.001 | 0.059 - 0.134 | Proxy | 0.335 | 0.018 | <0.001 | 0.3 - 0.371 |
| SUA | 0.272 | 0.078 | <0.001 | 0.118 - 0.425 | SUA | 0.241 | 0.141 | 0.09 | -0.035 - 0.517 | SUA | 0.385 | 0.091 | <0.001 | 0.207 - 0.564 |
| Intercepts | E0-E1 | 7.156 | 0.482 | <0.001 | 6.211 - 8.101 | F0-F1 | -1.709 | 0.865 | 0.05 | -3.406 - -0.013 | FLI0-FLI1 | 11.786 | 0.667 | <0.001 | 10.474 - 13.097 |
| E1-E2 | 7.847 | 0.492 | <0.001 | 6.882 - 8.813 | F1-F2 | 7.457 | 0.862 | <0.001 | 5.765 - 9.149 | FLI1-FLI2 | 14.318 | 0.746 | <0.001 | 12.849 - 15.787 |
| E2-E3 | 8.803 | 0.506 | <0.001 | 7.81 - 9.796 | F2-F3 | 8.716 | 0.885 | <0.001 | 6.979 - 10.453 |  |  |  |  |  |
|  |  |  |  |  | F3-F4 | 9.404 | 0.906 | <0.001 | 7.627 - 11.181 |  |  |  |  |  |

Table 2. Ordinal logistic regression models for described estimators.

| Model | Treatment | Mediator | Outcome | ACME | 95%CI | ADE | 95%CI | Total Effect | 95%CI | % Mediated | 95%CI |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | WHR | Uric acid | Steatosis | 0.015 | (0.01-0.021) | 0.186 | (0.146-0.221) | 0.197 | (0.158-0.231) | 7.68% | (5.07%-11.07%) |
| 2 | Uric Acid | WHR | 0.010 | (0.007-0.013) | 0.049 | (0.034-0.062) | 0.058 | (0.044-0.071) | 17.05% | (12.10%-23.90%) |

Table 3. Mediation models.