Table 1. Odds ratio (OR) and 95% confidence intervals (CI) of metabolic syndrome (MetS) according to quartiles of energy intake

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 　 |  | Men (n = 43 850) |  |  | Women (n = 86 573) |
| 　 | Q 1 | Q 2 | Q 3 | Q4 | *P*-value |  | Q 1 | Q 2 |  Q3 | Q 4 | *P*-value |
| Total energy intake (kcal/day, median)  | 1351 | 1654 | 1931 | 2416 | <0.001 |  | 1144 | 1509 | 1786 | 2237 | <0.001 |
| Age (years, median)  | 55.0 | 54.0 | 53.0 | 51.0 | <0.001 |  | 53.0 | 53.0 | 52.0 | 50.0 | <0.001 |
| Body mass index (kg/m2, median) | 24.1 | 24.2 | 24.4 | 24.6 | <0.001 |  | 23.2 | 23.3 | 23.4 | 23.4 | <0.001 |
| Marital status (yes, %)  | 92.8 | 94.4 | 95.3 | 94.4 | <0.001 |  | 83.2 | 85.9 | 88.3 | 89.8 | <0.001 |
| Education (≥12 years, %)  | 41.3 | 42.1 | 44.9 | 47.2 | <0.001 |  | 21.2 | 21.4 | 24.6 | 29.5 | <0.001 |
| Family income (≥$3,000/month, %)  | 46.3 | 47.5 | 51.6 | 53.3 | <0.001 |  | 40.8 | 41.1 | 44.9 | 49.1 | <0.001 |
| Occupied (yes, %) | 77.1 | 79.9 | 82.7 | 85.4 | <0.001 |  | 37.3 | 39.3 | 40.2 | 41.7 | <0.001 |
| Current smoker (yes, %)  | 30.6 | 30.5 | 31.1 | 35.3 | <0.001 |  | 3.01 | 2.20 | 2.15 | 1.98 | <0.001 |
| Current drinker (yes, %)  | 69.8 | 72.7 | 74.1 | 74.8 | <0.001 |  | 30.0 | 28.7 | 30.8 | 33.0 | <0.001 |
| Regular exercise (yes, %) Hypertension (yes, %)Diabetes (yes, %)Dyslipidemia (yes, %) | 53.653.235.540.45 | 56.952.735.240.00 | 58.752.333.940.11 | 59.351.032.940.05 | <0.001<0.001<0.0010.610 |  | 49.238.120.528.41 | 48.739.220.228.28 | 52.336.719.227.30 | 54.533.617.625.80 | <0.001<0.001<0.001<0.001 |
| Macronutrient intake (% of energy) |  |  |  |  |  |  |  |  |  |  |  |
|  Carbohydrate | 74.4 | 74.1 | 71.4 | 68.8 | <0.001 |  | 72.8 | 73.6 | 71.8 | 69.2 | <0.001 |
|  Protein | 12.3 | 12.4 | 13.2 | 13.9 | <0.001 |  | 13.4 | 12.9 | 13.5 | 14.3 | <0.001 |
| Fat | 11.6 | 11.7 | 14.0 | 16.4 | <0.001 |  | 12.9 | 12.2 | 13.8 | 16.1 | <0.001 |

Comparisons were made by Mantel-Haenszel chi-square test for categorical variables, and general linear regression for continuous variables.

**Table 2. Median macronutrient intake according to MetS and its components stratified by age group**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | MetS | Abdominal obesity | High triglyceride | Low HDL-c | High blood pressure | Hyperglycemia |
|  | case/controla | case/controla | case/controla | case/controla | case/controla | case/controla |
| **Men** |  |  |  |  |  |  |
| Energy (kcal/day) |   |  |  |  |  |  |
| 40-49 | 1875 (1590,2241)/1846 (1568,2217) | 1904 (1614,2285)/1836 (1559,2203) | 1860 (1576,2226)/1851 (1571,2225) | 1854 (1568,2215)/1855 (1574,2230) | 1865 (1570,2234)/1844 (1574,2217) | 1851 (1566,2225)/1856 (1575,2226) |
| 50-59 | 1778 (1525,2111)/1774 (1511,2096) | 1809 (1541,2152)/1763 (1505,2081) | 1778 (1522,2112)/1774 (1511,2089) | 1772 (1518,2106)/1777 (1515,2098) | 1770 (1516,2091)/1783 (1515,2110) | 1769 (1514,2093)/1780 (1517,2105) |
| 60-69 | 1727 (1473,2032)/1711 (1471,2013) | 1751 (1500,2069)/1700 (1459,1994) | 1720 (1473,2017)/1714 (1470,2019) | 1709 (1463,1997)/1719 (1474,2025) | 1716 (1473,2021)/1716 (1470,2014) | 1710 (1467,2011)/1721 (1474,2024) |
| Carbohydrate (g/day) |  |  |  |  |  |  |
| 40-49 | 327 (280,386)/324 (279,382) | 330 (282,394)/322 (278,379) | 324 (279,383)/324 (280,383) | 327 (279,383)/324 (279,383) | 325 (279,383)/324 (279,383) | 322 (277,381)/325 (280,383) |
| 50-59 | 316 (277,368)/317 (276,366) | 321 (278,375)/315 (275,364) | 317 (276,370)/317 (276,365) | 318 (279,369)/316 (275,366) | 315 (276,364)/318 (276,370) | 314 (276,364)/318 (276,369) |
| 60-69 | 312 (274,359)/311 (273,356) | 315 (276,364)/310 (272,354) | 312 (275,358)/312 (273,356) | 313 (275,358)/311 (273,356) | 311 (273,357)/312 (273,356) | 309 (272,355)/313 (274,359) |
| Protein (g/day) |  |  |  |  |  |  |
| 40-49 | 63.1 (51,79)/61.4 (49,78) | 64.3 (52,81)/60.7 (49,77) | 62.0 (49,78)/61.6 (49,78) | 61.2 (49,77)/61.9 (49,78) | 62.5 (50,78)/61.3 (49,78) | 62.5 (50,78)/61.5 (49,78) |
| 50-59 | 59.3 (47,74)/58.3 (46,73) | 60.3 (48,76)/57.8 (46,72) | 58.9 (47,73)/58.3 (46,73) | 57.6 (46,72)/58.9 (47,74) | 58.8 (47,73)/58.4 (47,73) | 59.0 (47,73)/58.4 (47,73) |
| 60-69 | 56.4 (45,71)/55.1 (44,70) | 57.5 (46,73)/54.6 (44,69) | 55.9 (44,70)/55.3 (44,70) | 54.8 (44,69)/55.7 (45,70) | 55.7 (44,70)/55.2 (45,70) | 55.9 (45,70)/55.3 (44,70) |
| Fat (g/day) |  |  |  |  |  |  |
| 40-49 | 31.5 (23,43)/30.7 (22,42) | 32.5 (23,45)/30.3 (22,42) | 31.1 (22,43)/30.8 (22,42) | 30.4 (22,41)/31.1 (22,43) | 30.9 (22,42)/30.9 (22,43) | 31.0 (22,43)/30.9 (22,42) |
| 50-59 | 26.8 (19,37)/26.8 (19,37) | 27.7 (20,39)/26.4 (18,37) | 26.8 (19,37)/26.8 (19,37) | 25.6 (18,36)/27.1 (19,38) | 26.6 (19,37)/26.9 (19,37) | 26.6 (19,37)/26.9 (19,37) |
| 60-69 | 24.4 (17,35)/23.9 (17,34) | 25.5 (18,36)/23.4 (16,33) | 24.3 (17,34)/23.9 (17,34) | 23.0 (16,33)/24.4 (17,34) | 24.0 (16,34)/24.2 (17,34) | 24.2 (17,34)/24.0 (16,34) |
| **Women** |  |  |  |  |  |  |
| Energy (kcal/day) |   |  |  |  |  |  |
| 40-49 | 1699 (1404,2044)/1703 (1393,2039) | 1722 (1418,2062)/1693 (1386,2030) | 1700 (1393,2051)/1703 (1395,2038) | 1709 (1407,2043)/1699 (1388,2039) | 1685 (1392,2021)/1707 (1396,2044) | 1691 (1395,2023)/1704 (1395,2042) |
| 50-59 | 1632 (1367,1937)/1635 (1342,1947) | 1649 (1377,1958)/1621 (1329,1935) | 1629 (1352,1940)/1635 (1350,1946) | 1623 (1357,1929)/1640 (1346,1954) | 1630 (1356,1937)/1636 (1346,1949) | 1627 (1347,1939)/1636 (1351,1945) |
| 60-69 | 1564 (1310,1842)/1571 (1308,1865) | 1573 (1318,1861)/1560 (1292,1850) | 1567 (1307,1854)/1569 (1308,1857) | 1553 (1298,1834)/1581 (1316,1869) | 1568 (1311,1848)/1568 (1303,1863) | 1557 (1288,1830)/1573 (1316,1865) |
| Carbohydrate (g/day) |  |  |  |  |  |  |
| 40-49 | 307 (252,359)/305 (246,358) | 309 (252,361)/303 (244,357) | 307 (248,362)/305 (246,357) | 308 (253,361)/303 (244,357) | 305 (248,357)/305 (246,358) | 303 (247,355)/305 (246,358) |
| 50-59 | 302 (253,349)/299 (243,349) | 303 (253,350)/297 (240,347) | 301 (249,350)/299 (244,348) | 300 (250,347)/299 (243,349) | 300 (248,349)/299 (244,349) | 300 (246,347)/300 (245,349) |
| 60-69 | 295 (247,339)/293 (242,338) | 295 (248,340)/292 (239,337) | 295 (247,341)/293 (243,337) | 293 (245,337)/294 (244,340) | 294 (246,339)/293 (243,338) | 292 (241,335)/295 (246,340) |
| Protein (g/day) |  |  |  |  |  |  |
| 40-49 | 55.7 (44,71)/56.1 (44,71) | 57.2 (45,72)/55.7 (44,70) | 55.6 (44,71)/56.2 (44,71) | 55.9 (44,71)/56.2 (44,71) | 55.3 (44,70)/56.3 (44,71) | 56.1 (44,71)/56.1 (44,71) |
| 50-59 | 52.4 (42,67)/53.3 (42,68) | 53.5 (42,68)/52.7 (41,67) | 52.2 (41,66)/53.3 (42,68) | 52.1 (41,66)/53.5 (42,68) | 52.7 (42,67)/53.3 (42,68) | 52.6 (41,67)/53.1 (42,67) |
| 60-69 | 49.3 (39,62)/50.0 (40,64) | 49.7 (39,63)/49.6 (39,63) | 49.4 (39,62)/49.8 (39,63) | 48.9 (39,61)/50.5 (40,64) | 49.6 (39,63)/49.7 (39,63) | 49.2 (39,62)/49.9 (39,63) |
| Fat (g/day) |  |  |  |  |  |  |
| 40-49 | 25.3 (18,36)/26.5 (19,37) | 26.7 (19,37)/26.3 (19,37) | 25.3 (17,36)/26.5 (19,37) | 25.5 (18,36)/26.8 (19,37) | 25.2 (18,36)/26.7 (19,37) | 26.2 (18,37)/26.4 (19,37) |
| 50-59 | 21.2 (15,30)/22.8 (16,32) | 22.3 (15,32)/22.4 (16,32) | 21.4 (15,31)/22.8 (16,32) | 21.2 (14,30)/23.1 (16,33) | 21.8 (15,31)/22.8 (16,32) | 21.8 (15,31)/22.5 (16,32) |
| 60-69 | 18.4 (12,27)/19.6 (14,29) | 18.9 (13,27)/19.4 (13,28) | 18.7 (12,27)/19.3 (13,28) | 18.0 (12,26)/19.9 (14,29) | 19.0 (13,27)/19.3 (13,28) | 18.7 (13,27)/19.3 (13,28) |

HDL-c: High density lipoprotein cholesterol

a Median (Interquartile range, Q1,Q3).

1. Energy B. Carbohydrate

 

C. Protein D. Fat

 

HDL-c: High density lipoprotein cholesterol.

b Adjusted for for age, body mass index, marital status, education, family income, occupation, smoking, drinking, regular exercise and energy intake.

Figure 1a. Odds ratios and 95% CI of MetS components stratified by age group in men

1. Energy B. Carbohydrate

  

C. Protein D. Fat

 

HDL-c: High density lipoprotein cholesterol.

b Adjusted for for age, body mass index, marital status, education, family income, occupation, smoking, drinking, regular exercise, energy intake and menopausal status.

Figure 1b. Odds ratios and 95% CI of MetS components stratified by age group in women

Table 3. **Median macronutrient intake according to MetS and its components stratified by macronutrient source**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | MetS | Abdominal obesity | High triglyceride | Low HDL-c | High blood pressure | Hyperglycemia |
|  | Case/controla | Case/controla | Case/controla | Case/controla | Case/controla | Case/controla |
| **Men** |  |  |  |  |  |  |
| Carbohydrate (g/day) |  |  |  |  |  |  |
| Plant | 309 (270,358)/308 (269,356) | 312 (272,364)/306 (268,353) | 309 (270,359)/307 (269,355) | 309 (271,358)/307 (269,356) | 307 (269,354)/309 (269,358) | 306 (268,353)/309 (270,358) |
| Animal | 6.2 (2,14)/7.2 (3,15) | 6.7 (2,15)/7.0 (2,15) | 6.4 (2,14)/7.2 (3,15) | 6.5 (2,14)/7.0 (2,15) | 6.5 (2,14)/7.4 (3,15) | 6.3 (2,14)/7.2 (3,15) |
| Protein (g/day) |  |  |  |  |  |  |
| Plant | 36.9 (31,44)/36.5 (31,44) | 37.4 (31,45)/36.3 (31,43) | 36.9 (31,44)/36.4 (31,43) | 36.5 (31,44)/36.6 (31,44) | 36.7 (31,44)/36.5 (31,44) | 36.5 (31,44)/36.6 (31,44) |
| Animal | 21.3 (14,32)/21.0 (13,32) | 22.3 (14,33)/20.6 (13,31) | 21.2 (14,32)/20.9 (13,32) | 20.1 (13,31)/21.3 (14,32) | 20.9 (13,31)/21.2 (14,32) | 21.1 (13,32)/21.0 (13,32) |
| Fat (g/day) |  |  |  |  |  |  |
| Plant | 10.8 (8,15)/10.9 (8,15) | 11.1 (8,16)/10.7 (8,15) | 11.0 (8,15)/10.7 (8,15) | 10.6 (8,15)/10.9 (8,15) | 10.7 (8,15)/11.0 (8,15) | 10.4 (7,15)/11.1 (8,15) |
| Animal | 15.4 (10,24)/15.5 (10,24) | 16.2 (10,25)/15.2 (9,23) | 15.5 (10,24)/15.4 (10,24) | 14.4 (9,23)/15.7 (10,24) | 15.2 (9,23)/15.7 (10,24) | 15.3 (10,24)/15.5 (10,24) |
| **Women** |  |  |  |  |  |  |
| Carbohydrate (g/day) |  |  |  |  |  |  |
| Plant | 290 (241,334)/290 (232,337) | 292 (241,336)/288 (230,336) | 290 (238,336)/290 (234,336) | 291 (240,336)/289 (231,336) | 289 (237,333)/290 (233,337) | 288 (234,332)/290 (235,337) |
| Animal | 7.8 (3,16)/9.8 (4,19) | 8.7 (3,17)/9.8 (4,19) | 8.6 (3,17)/9.7 (4,18) | 8.2 (3,16)/9.9 (4,19) | 8.8 (3,17)/9.8 (4,18) | 8.6 (3,17)/9.7 (3,18) |
| Protein (g/day) |  |  |  |  |  |  |
| Plant | 33.7 (28,40)/33.8 (28,41) | 34.0 (28,41)/33.7 (27,41) | 33.7 (28,40)/33.8 (28,41) | 33.7 (28,40)/33.8 (28,41) | 33.6 (28,40)/33.9 (28,41) | 33.5 (27,40)/33.8 (28,41) |
| Animal | 17.5 (11,27)/19.6 (12,29) | 18.7 (12,28)/19.4 (12,29) | 17.8 (11,27)/19.5 (12,29) | 18.0 (11,28)/19.7 (13,30) | 18.0 (11,28)/19.7 (13,29) | 18.3 (11,28)/19.3 (12,29) |
| Fat (g/day) |  |  |  |  |  |  |
| Plant | 8.3 (6,12)/9.3 (7,13) | 8.7 (6,13)/9.3 (6,13) | 8.6 (6,12)/9.2 (6,13) | 8.6 (6,12)/9.4 (7,13) | 8.6 (6,12)/9.4 (7,14) | 8.5 (6,12)/9.2 (6,13) |
| Animal | 11.7 (7,19)/13.7 (8,21) | 12.7 (8,20)/13.6 (8,21) | 11.9 (7,19)/13.6 (8,21) | 12.2 (7,19)/13.8 (9,21) | 12.2 (7,19)/13.8 (9,21) | 12.4 (7,20)/13.4 (8,21) |

HDL-c: High density lipoprotein cholesterol

a Median (Interquartile range, Q1,Q3).