

PREHRAMBENE NAVIKE I ZDRAVSTVENI ISHODI TIJEKOM ŽIVOTA

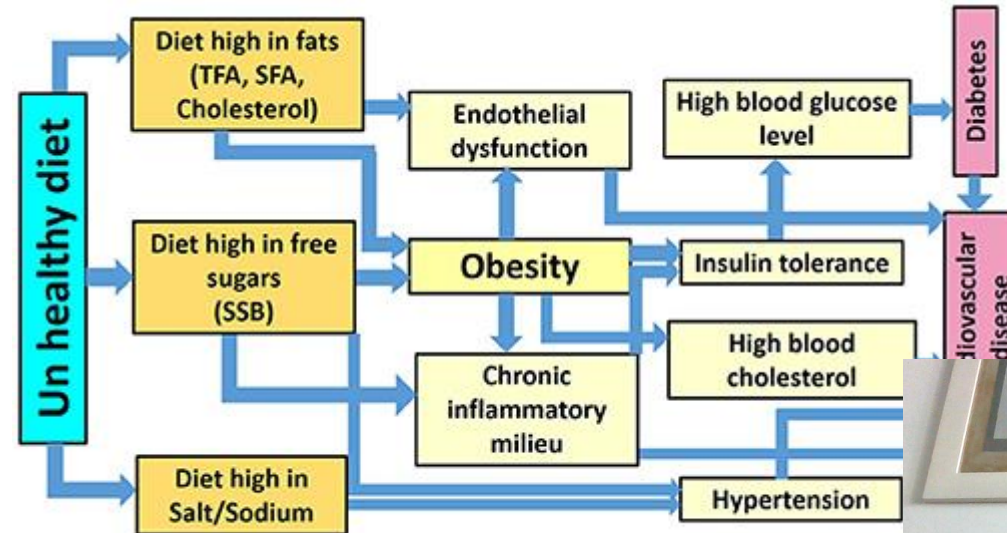
Doc.dr.sc. Ana-Marija Liberati Pršo
MEF Rijeka



UNHEALTHY DIET BURDEN

- Following unhealthy dietary patterns and sedentary lifestyles has led to a notable increase in the prevalence of overweight and obesity worldwide. Non-communicable chronic diseases (NCDs) related to unhealthy dietary patterns and weight gain have expanded in parallel, being the major cause of morbidity and mortality both in developed and underdeveloped countries

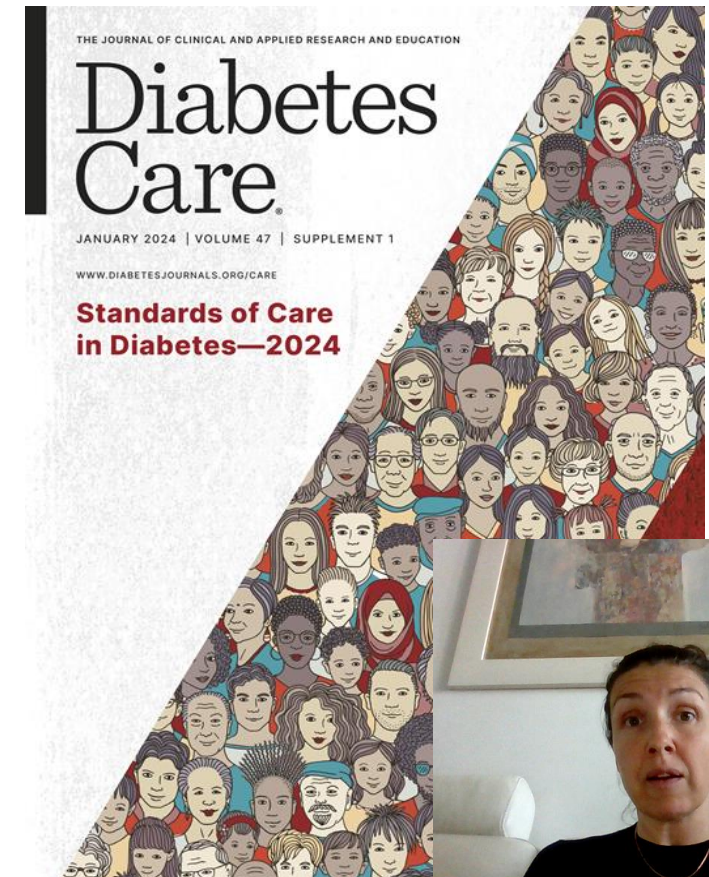
The interdisciplinary relationship between unhealthy diet consumption, obesity, and other NCDs risk factors.. Al-Jawaldeh, A., & Abbass, M. M. (2022). **Unhealthy dietary habits and obesity: the major risk factors beyond non-communicable diseases in the eastern mediterranean region.** *Frontiers in Nutrition*, 9, 817808.



RATHER HEALTHY THAN LOW-CALORIE

- Recent evidence supports the implementation of healthy food-based dietary interventions instead of calorie or isolated nutrient restriction diets.

Mozaffarian, D. Dietary and Policy Priorities for Cardiovascular Disease, Diabetes, and Obesity: A Comprehensive Review. *Circulation* **2016**, *133*, 187–225.
McGuire, S. Scientific Report of the 2015 Dietary Guidelines Advisory Committee. Washington, DC: US Departments of Agriculture and Health and Human Services, 2015. *Adv. Nutr.* **2016**, *7*, 202–204.
American Diabetes Association Professional Practice Committee; Standards of Care in Diabetes - 2023. *Diabetes Care*; **2023**(46, Suppl.1):S1-S291



MEDICAL NUTRITION THERAPY

Diabetes Care Volume 42, May 2019

731



Nutrition Therapy for Adults With Diabetes or Prediabetes: A Consensus Report

Diabetes Care 2019;42:731–754 | <https://doi.org/10.2337/dci19-0014>

This Consensus Report is intended to provide clinical professionals with evidence-based guidance about individualizing nutrition therapy for adults with diabetes or prediabetes. Strong evidence supports the efficacy and cost-effectiveness of nutrition therapy as a component of quality diabetes care, including its integration into the medical management of diabetes; therefore, it is important that all members of the health care team know and champion the benefits of nutrition therapy and key nutrition messages. Nutrition counseling that works toward improving or maintaining glycemic targets, achieving weight management goals, and improving cardiovascular risk factors (e.g., blood pressure, lipids, etc.) within individualized treatment goals is recommended for all adults with diabetes and prediabetes.

Though it might simplify messaging, a “one-size-fits-all” eating plan is not evident for the prevention or management of diabetes, and it is an unrealistic expectation given the broad spectrum of people affected by diabetes and prediabetes, their cultural backgrounds, personal preferences, co-occurring conditions (often referred to as comorbidities), and socioeconomic settings in which they live. Research provides clarity on many food choices and eating patterns that can help people achieve health goals and quality of life. The American Diabetes Association (ADA) emphasizes that medical nutrition therapy (MNT) is fundamental in the overall diabetes management plan, and the need for MNT should be reassessed frequently by health care providers in collaboration with people with diabetes across the life span, with special attention during times of changing health status and life stages (1–3).

This Consensus Report now includes information on prediabetes, and previous ADA nutrition position statements, the last of which was published in 2014 (4), did not. Unless otherwise noted, the research reviewed was limited to those studies conducted in adults diagnosed with prediabetes, type 1 diabetes, and/or type 2 diabetes. Nutrition therapy for children with diabetes or women with gestational diabetes mellitus is not addressed in this review but is covered in other ADA publications, specifically *Standards of Medical Care in Diabetes* (5,6).

DATA SOURCES, SEARCHES, AND STUDY SELECTION

The authors of this report were chosen following a national call for experts to ensure diversity of the members both in professional interest and cultural background, including a person living with diabetes who served as a patient advocate. An outside market research company was used to conduct the literature search and was paid using ADA funds. The authors convened in person for one group meeting and actively participated in monthly teleconference calls between February and November 2018. Focused teleconference calls, email, and web-based collaboration were also used to reach consensus on final recommendations between November 2018 and January 2019. The 2014 position statement (4) was used as a starting point, and a search was conducted on PubMed for studies published in English between 1 January 2014 and 28 February 2018 to provide the updated evidence of nutrition therapy interventions in nonhospitalized adults with prediabetes and type 1 and type 2 diabetes. Details on the keywords and the search strategy are reported in the Supplementary Data, emphasizing randomized controlled trials (RCTs), systematic reviews, and meta-analyses of RCTs. An exception was made to the inclusion criteria for the use of meal studies for the insulin dosing section. In addition to the search results, in select cases the authors identified relevant research to include in reaching consensus. The

Alison B. Evert,¹ Michelle Dennison,² Christopher D. Gardner,³ W. Timothy Garvey,^{4,5} Ka Hei Karen Lau,⁶ Janice MacLeod,⁷ Joanna Mitri,⁸ Raquel F. Pereira,⁹ Kelly Rawlings,¹⁰ Shamara Robinson,¹¹ Laura Saslow,¹² Sacha Uelmen,¹³ Patricia B. Urbanski,¹³ and William S. Yancy Jr.^{14,15}

¹UW Neighborhood Clinics, UW Medicine, University of Washington, Seattle, WA

²Oklahoma City Indian Clinic, Oklahoma City, OK

³Stanford Diabetes Research Center and Stanford Prevention Research Center, Department of Medicine, Stanford University, Stanford, CA

⁴Diabetes Research Center, Department of Nutrition Sciences, University of Alabama at Birmingham, Birmingham, AL

⁵Birmingham Veterans Affairs Medical Center, Birmingham, AL

⁶Joslin Diabetes Center, Boston, MA

⁷Companion Medical, Inc., Columbia, MD

⁸Section on Clinical, Behavioral and Outcomes Research, National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health, Bethesda, MD

⁹Section on Clinical, Behavioral and Outcomes Research, National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health, Bethesda, MD

¹⁰Simple Concepts Consulting, Bellevue, WA

¹¹Vida Health, San Francisco, CA

¹²American Diabetes Association, Arlington, VA

¹³Department of Health Behavior and Biological Sciences, University of Michigan School of Nursing, Ann Arbor, MI

¹⁴St. Luke's Health Care System, Duluth, MN

¹⁵Duke Diet and Fitness Center, Department of Medicine, Duke University Health System, Durham, NC

¹⁶Durham Veterans Affairs Medical Center, Durham, NC

Corresponding author: William S. Yancy Jr., will.yancy@duke.edu

This article contains Supplementary Data online at <http://care.diabetesjournals.org/lookup/suppl/doi:10.2337/dci19-0014/-/DC1>.

This article is part of a special article collection available at <http://care.diabetesjournals.org/evolution-nutritional-therapy>.

This article is featured in a podcast available at <http://www.diabetesjournals.org/content/diabetes-care-update-podcasts>.

© 2019 by the American Diabetes Association. Readers may use this article as long as the work is properly cited, the use is educational and not for profit, and the work is not altered. More information is available at <http://www.diabetesjournals.org/content/license>.



Smjernice | Guidelines

Smjernice za prehranu kod šećerne bolesti u odrasloj dobi*

Medical nutrition therapy guidelines for diabetes in adults

Eva Pavić,^{1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63,64,65,66,67,68,69,70,71,72,73,74,75,76,77,78,79,80,81,82,83,84,85,86,87,88,89,90,91,92,93,94,95,96,97,98,99,100,101,102,103,104,105,106,107,108,109,110,111,112,113,114,115,116,117,118,119,120,121,122,123,124,125,126,127,128,129,130,131,132,133,134,135,136,137,138,139,140,141,142,143,144,145,146,147,148,149,150,151,152,153,154,155,156,157,158,159,160,161,162,163,164,165,166,167,168,169,170,171,172,173,174,175,176,177,178,179,180,181,182,183,184,185,186,187,188,189,190,191,192,193,194,195,196,197,198,199,200,201,202,203,204,205,206,207,208,209,210,211,212,213,214,215,216,217,218,219,220,221,222,223,224,225,226,227,228,229,230,231,232,233,234,235,236,237,238,239,240,241,242,243,244,245,246,247,248,249,250,251,252,253,254,255,256,257,258,259,260,261,262,263,264,265,266,267,268,269,270,271,272,273,274,275,276,277,278,279,280,281,282,283,284,285,286,287,288,289,290,291,292,293,294,295,296,297,298,299,300,301,302,303,304,305,306,307,308,309,310,311,312,313,314,315,316,317,318,319,320,321,322,323,324,325,326,327,328,329,330,331,332,333,334,335,336,337,338,339,340,341,342,343,344,345,346,347,348,349,350,351,352,353,354,355,356,357,358,359,360,361,362,363,364,365,366,367,368,369,370,371,372,373,374,375,376,377,378,379,380,381,382,383,384,385,386,387,388,389,390,391,392,393,394,395,396,397,398,399,400,401,402,403,404,405,406,407,408,409,410,411,412,413,414,415,416,417,418,419,420,421,422,423,424,425,426,427,428,429,430,431,432,433,434,435,436,437,438,439,440,441,442,443,444,445,446,447,448,449,450,451,452,453,454,455,456,457,458,459,460,461,462,463,464,465,466,467,468,469,470,471,472,473,474,475,476,477,478,479,480,481,482,483,484,485,486,487,488,489,490,491,492,493,494,495,496,497,498,499,500,501,502,503,504,505,506,507,508,509,510,511,512,513,514,515,516,517,518,519,520,521,522,523,524,525,526,527,528,529,530,531,532,533,534,535,536,537,538,539,540,541,542,543,544,545,546,547,548,549,550,551,552,553,554,555,556,557,558,559,560,561,562,563,564,565,566,567,568,569,570,571,572,573,574,575,576,577,578,579,580,581,582,583,584,585,586,587,588,589,590,591,592,593,594,595,596,597,598,599,600,601,602,603,604,605,606,607,608,609,610,611,612,613,614,615,616,617,618,619,620,621,622,623,624,625,626,627,628,629,630,631,632,633,634,635,636,637,638,639,640,641,642,643,644,645,646,647,648,649,650,651,652,653,654,655,656,657,658,659,660,661,662,663,664,665,666,667,668,669,670,671,672,673,674,675,676,677,678,679,680,681,682,683,684,685,686,687,688,689,690,691,692,693,694,695,696,697,698,699,700,701,702,703,704,705,706,707,708,709,710,711,712,713,714,715,716,717,718,719,720,721,722,723,724,725,726,727,728,729,730,731,732,733,734,735,736,737,738,739,740,741,742,743,744,745,746,747,748,749,750,751,752,753,754,755,756,757,758,759,760,761,762,763,764,765,766,767,768,769,770,771,772,773,774,775,776,777,778,779,780,781,782,783,784,785,786,787,788,789,790,791,792,793,794,795,796,797,798,799,800,801,802,803,804,805,806,807,808,809,810,811,812,813,814,815,816,817,818,819,820,821,822,823,824,825,826,827,828,829,830,831,832,833,834,835,836,837,838,839,840,841,842,843,844,845,846,847,848,849,850,851,852,853,854,855,856,857,858,859,860,861,862,863,864,865,866,867,868,869,870,871,872,873,874,875,876,877,878,879,880,881,882,883,884,885,886,887,888,889,890,891,892,893,894,895,896,897,898,899,900,901,902,903,904,905,906,907,908,909,910,911,912,913,914,915,916,917,918,919,920,921,922,923,924,925,926,927,928,929,930,931,932,933,934,935,936,937,938,939,940,941,942,943,944,945,946,947,948,949,950,951,952,953,954,955,956,957,958,959,960,961,962,963,964,965,966,967,968,969,970,971,972,973,974,975,976,977,978,979,980,981,982,983,984,985,986,987,988,989,990,991,992,993,994,995,996,997,998,999,1000,1001,1002,1003,1004,1005,1006,1007,1008,1009,1010,1011,1012,1013,1014,1015,1016,1017,1018,1019,1020,1021,1022,1023,1024,1025,1026,1027,1028,1029,1030,1031,1032,1033,1034,1035,1036,1037,1038,1039,1040,1041,1042,1043,1044,1045,1046,1047,1048,1049,1050,1051,1052,1053,1054,1055,1056,1057,1058,1059,1060,1061,1062,1063,1064,1065,1066,1067,1068,1069,1070,1071,1072,1073,1074,1075,1076,1077,1078,1079,1080,1081,1082,1083,1084,1085,1086,1087,1088,1089,1090,1091,1092,1093,1094,1095,1096,1097,1098,1099,1100,1101,1102,1103,1104,1105,1106,1107,1108,1109,1110,1111,1112,1113,1114,1115,1116,1117,1118,1119,1120,1121,1122,1123,1124,1125,1126,1127,1128,1129,1130,1131,1132,1133,1134,1135,1136,1137,1138,1139,1140,1141,1142,1143,1144,1145,1146,1147,1148,1149,1150,1151,1152,1153,1154,1155,1156,1157,1158,1159,1160,1161,1162,1163,1164,1165,1166,1167,1168,1169,1170,1171,1172,1173,1174,1175,1176,1177,1178,1179,1180,1181,1182,1183,1184,1185,1186,1187,1188,1189,1190,1191,1192,1193,1194,1195,1196,1197,1198,1199,1200,1201,1202,1203,1204,1205,1206,1207,1208,1209,1210,1211,1212,1213,1214,1215,1216,1217,1218,1219,1220,1221,1222,1223,1224,1225,1226,1227,1228,1229,1230,1231,1232,1233,1234,1235,1236,1237,1238,1239,1240,1241,1242,1243,1244,1245,1246,1247,1248,1249,1250,1251,1252,1253,1254,1255,1256,1257,1258,1259,1260,1261,1262,1263,1264,1265,1266,1267,1268,1269,1270,1271,1272,1273,1274,1275,1276,1277,1278,1279,1280,1281,1282,1283,1284,1285,1286,1287,1288,1289,1290,1291,1292,1293,1294,1295,1296,1297,1298,1299,1300,1301,1302,1303,1304,1305,1306,1307,1308,1309,1310,1311,1312,1313,1314,1315,1316,1317,1318,1319,1320,1321,1322,1323,1324,1325,1326,1327,1328,1329,1330,1331,1332,1333,1334,1335,1336,1337,1338,1339,1340,1341,1342,1343,1344,1345,1346,1347,1348,1349,1350,1351,1352,1353,1354,1355,1356,1357,1358,1359,1360,1361,1362,1363,1364,1365,1366,1367,1368,1369,1370,1371,1372,1373,1374,1375,1376,1377,1378,1379,1380,1381,1382,1383,1384,1385,1386,1387,1388,1389,1390,1391,1392,1393,1394,1395,1396,1397,1398,1399,1400,1401,1402,1403,1404,1405,1406,1407,1408,1409,1410,1411,1412,1413,1414,1415,1416,1417,1418,1419,1420,1421,1422,1423,1424,1425,1426,1427,1428,1429,1430,1431,1432,1433,1434,1435,1436,1437,1438,1439,1440,1441,1442,1443,1444,1445,1446,1447,1448,1449,1450,1451,1452,1453,1454,1455,1456,1457,1458,1459,1460,1461,1462,1463,1464,1465,1466,1467,1468,1469,1470,1471,1472,1473,1474,1475,1476,1477,1478,1479,1480,1481,1482,1483,1484,1485,1486,1487,1488,1489,1490,1491,1492,1493,1494,1495,1496,1497,1498,1499,1500,1501,1502,1503,1504,1505,1506,1507,1508,1509,1510,1511,1512,1513,1514,1515,1516,1517,1518,1519,1520,1521,1522,1523,1524,1525,1526,1527,1528,1529,1530,1531,1532,1533,1534,1535,1536,1537,1538,1539,1540,1541,1542,1543,1544,1545,1546,1547,1548,1549,1550,1551,1552,1553,1554,1555,1556,1557,1558,1559,1560,1561,1562,1563,1564,1565,1566,1567,1568,1569,1570,1571,1572,1573,1574,1575,1576,1577,1578,1579,1580,1581,1582,1583,1584,1585,1586,1587,1588,1589,1590,1591,1592,1593,1594,1595,1596,1597,1598,1599,1600,1601,1602,1603,1604,1605,1606,1607,1608,1609,1610,1611,1612,1613,1614,1615,1616,1617,1618,1619,1620,1621,1622,1623,1624,1625,1626,1627,1628,1629,1630,1631,1632,1633,1634,1635,1636,1637,1638,1639,1640,1641,1642,1643,1644,1645,1646,1647,1648,1649,1650,1651,1652,1653,1654,1655,1656,1657,1658,1659,1660,1661,1662,1663,1664,1665,1666,1667,1668,1669,1670,1671,1672,1673,1674,1675,1676,1677,1678,1679,1680,1681,1682,1683,1684,1685,1686,1687,1688,1689,1690,1691,1692,1693,1694,1695,1696,1697,1698,1699,1700,1701,1702,1703,1704,1705,1706,1707,1708,1709,1710,1711,1712,1713,1714,1715,1716,1717,1718,1719,1720,1721,1722,1723,1724,1725,1726,1727,1728,1729,1730,1731,1732,1733,1734,1735,1736,1737,1738,1739,1740,1741,1742,1743,1744,1745,1746,1747,1748,1749,1750,1751,1752,1753,1754,1755,1756,1757,1758,1759,1760,1761,1762,1763,1764,1765,1766,1767,1768,1769,1770,1771,1772,1773,1774,1775,1776,1777,1778,1779,1780,1781,1782,1783,1784,1785,1786,1787,1788,1789,1790,1791,1792,1793,1794,1795,1796,1797,1798,1799,1800,1801,1802,1803,1804,1805,1806,1807,1808,1809,1810,1811,1812,1813,1814,1815,1816,1817,1818,1819,1820,1821,1822,1823,1824,1825,1826,1827,1828,1829,1830,1831,1832,1833,1834,1835,1836,1837,1838,1839,1840,1841,1842,1843,1844,1845,1846,1847,1848,1849,1850,1851,1852,1853,1854,1855,1856,1857,1858,1859,1860,1861,1862,1863,1864,1865,1866,1867,1868,1869,1870,1871,1872,1873,1874,1875,1876,1877,1878,1879,1880,1881,1882,1883,1884,1885,1886,1887,1888,1889,1890,1891,1892,1893,1894,1895,1896,1897,1898,1899,1900,1901,1902,1903,1904,1905,1906,1907,1908,1909,1910,1911,1912,1913,1914,1915,1916,1917,1918,1919,1920,1921,1922,1923,1924,1925,1926,1927,1928,1929,1930,1931,1932,1933,1934,1935,1936,1937,1938,1939,1940,1941,1942,1943,1944,1945,1946,1947,1948,1949,1950,1951,1952,1953,1954,1955,1956,1957,1958,1959,1960,1961,1962,1963,1964,1965,1966,1967,1968,1969,1970,1971,1972,1973,1974,1975,1976,1977,1978,1979,1980,1981,1982,1983,1984,1985,1986,1987,1988,1989,1990,1991,1992,1993,1994,1995,1996,1997,1998,1999,2000,2001,2002,2003,2004,2005,2006,2007,2008,2009,2010,2011,2012,2013,2014,2015,2016,2017,2018,2019,2020,2021,2022,2023,2024,2025,2026,2027,2028,2029,2030,2031,2032,2033,2034,2035,2036,2037,2038,2039,2040,2041,2042,2043,2044,2045,2046,2047,2048,2049,2050,2051,2052,2053,2054,2055,2056,2057,2058,2059,2060,2061,2062,2063,2064,2065,2066,2067,2068,2069,2070,2071,2072,2073,2074,2075,2076,2077,2078,2079,2080,2081,2082,2083,2084,2085,2086,2087,2088,2089,2090,2091,2092,2093,2094,2095,2096,2097,2098,2099,2100,2101,2102,2103,2104,2105,2106,2107,2108,2109,2110,2111,2112,2113,2114,2115,2116}

Personalize the diet !

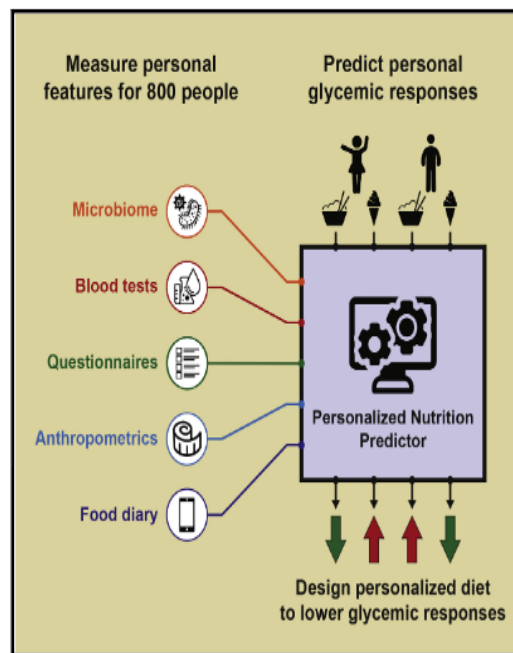
„...universal dietary
recommendations may have
limited utility“:

Zeevi, David et al. “Personalized Nutrition by
Prediction of Glycemic Responses.” *Cell* vol. 163,5
(2015): 1079-1094



Personalized Nutrition by Prediction of Glycemic Responses

Graphical Abstract



Zeevi, David et al. "Personalized Nutrition by Prediction of Glycemic Responses." *Cell* vol. 163,5 (2015): 1079-1094

Article

Authors

David Zeevi, Tal Korem, Niv Zmora, ..., Zamir Halpern, Eran Elinav, Eran Segal

Correspondence

eran.elinav@weizmann.ac.il (E.E.),
eran.segal@weizmann.ac.il (E.S.)

In Brief

People eating identical meals present high variability in post-meal blood glucose response. Personalized diets created with the help of an accurate predictor of blood glucose response that integrates parameters such as dietary habits, physical activity, and gut microbiota may successfully lower post-meal blood glucose and its long-term metabolic consequences.

Article

Personalized Nutrition by Prediction of Glycemic Responses

David Zeevi,^{1,2,8} Tal Korem,^{1,2,8} Niv Zmora,^{3,4,5,8} David Israeli,^{6,8} Daphna Rothschild,^{1,2} Adina Weinberger,^{1,2} Orly Ben-Yacov,^{1,2} Dar Lador,^{1,2} Tali Avnit-Sagi,^{1,2} Maya Lotan-Pompan,^{1,2} Jotham Suez,³ Jemal Ali Mahdi,³ Elad Matot,^{1,2} Gal Malka,^{1,2} Noa Kosower,^{1,2} Michal Rein,^{1,2} Gili Zilberman-Schapira,³ Lenka Dohnalová,³ Meirav Pevsner-Fischer,³ Rony Bikovsky,^{1,2} Zamir Halpern,^{5,7} Eran Elinav,^{3,9,*} and Eran Segal^{1,2,9,*}

¹Department of Computer Science and Applied Mathematics, Weizmann Institute of Science, Rehovot 7610001, Israel

²Department of Molecular Cell Biology, Weizmann Institute of Science, Rehovot 7610001, Israel

³Immunology Department, Weizmann Institute of Science, Rehovot 7610001, Israel

⁴Internal Medicine Department, Tel Aviv Sourasky Medical Center, Tel Aviv 6423906, Israel

⁵Research Center for Digestive Tract and Liver Diseases, Tel Aviv Sourasky Medical Center, Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv 6423906, Israel

⁶Day Care Unit and the Laboratory of Imaging and Brain Stimulation, Kfar Shaul Hospital, Jerusalem Center for Mental Health, Jerusalem 9106000, Israel

⁷Digestive Center, Tel Aviv Sourasky Medical Center, Tel Aviv 6423906, Israel

⁸Co-first author

⁹Co-senior author

*Correspondence: eran.elinav@weizmann.ac.il (E.E.), eran.segal@weizmann.ac.il (E.S.)

<http://dx.doi.org/10.1016/j.cell.2015.11.001>

SUMMARY

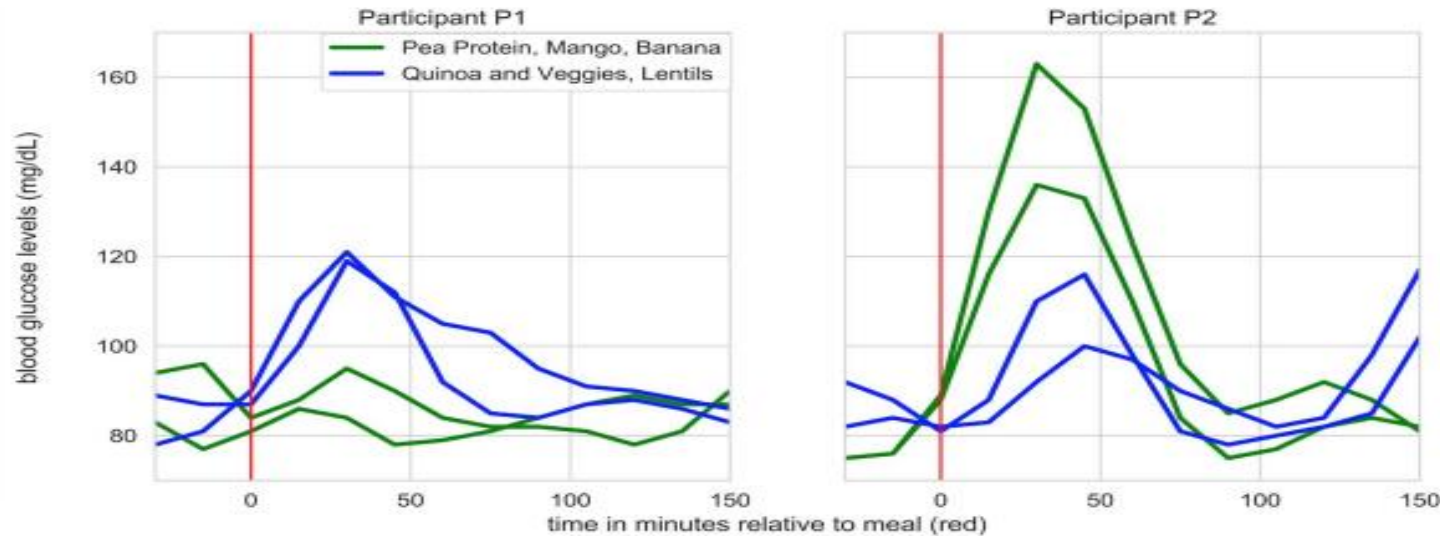
Elevated postprandial blood glucose levels constitute a global epidemic and a major risk factor for pre-diabetes and type II diabetes, but existing dietary methods for controlling them have limited efficacy. Here, we continuously monitored week-long glucose levels in an 800-person cohort, measured responses to 46,898 meals, and found high variability in the response to identical meals, suggesting that universal dietary recommendations may have limited utility. We devised a machine-learning algorithm that integrates blood parameters, dietary habits, anthropometrics, physical activity, and gut microbiota measured in this cohort and showed that it accurately predicts personalized postprandial glycemic response to real-life meals. We validated these predictions in an independent 100-person cohort. Finally, a blinded randomized controlled dietary intervention based on this algorithm resulted in significantly lower postprandial responses and consistent alterations to gut microbiota configuration. Together, our results suggest that personalized diets may successfully modify elevated postprandial blood glucose and its metabolic consequences.

terized by chronically impaired blood glucose responses, is a significant risk factor for type II diabetes mellitus (T2DM), with up to 70% of prediabetics eventually developing the disease (Nathan et al., 2007). It is also linked to other manifestations, collectively termed the metabolic syndrome, including obesity, hypertension, non-alcoholic fatty liver disease, hypertriglyceridemia, and cardiovascular disease (Grund, 2012). Thus, maintaining normal blood glucose levels is considered critical for preventing and controlling the metabolic syndrome (Riccardi and Rivellese, 2000).

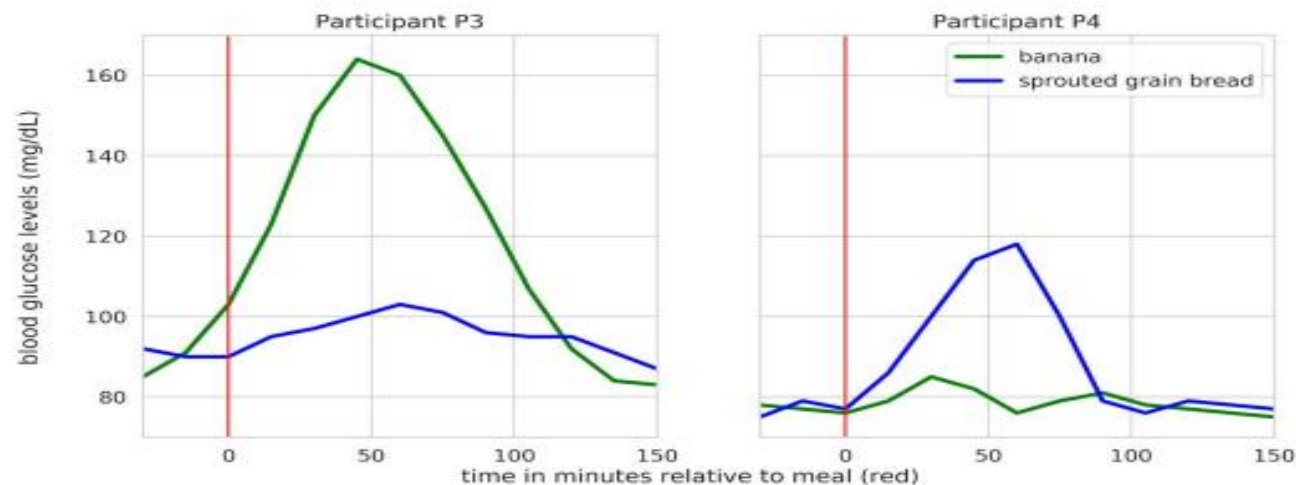
Dietary intake is a central determinant of blood glucose levels, and thus, in order to achieve normal glucose levels it is imperative to make food choices that induce normal postprandial (post-meal) glycemic responses (PPGR; Gallwitz, 2009). Postprandial hyperglycemia is an independent risk factor for the development of T2DM (American Diabetes Association., 2015a), cardiovascular disease (Gallwitz, 2009), and liver cirrhosis (Nishi et al., 2006) and is associated with obesity (Blaak et al., 2011), enhanced all-cause mortality in both T2DM (Cavalli et al., 2011) and cancer (Lamkin et al., 2009).

Despite their importance, no method exists for PPGRs to food. The current practice is to use the moderate content (American Diabetes Association., 2011), even though it is a poor predictor of (Conn and Newburgh, 1936). Other methods aimed at PPGRs are the glycemic index, which quantifies PPGRs of a single tested food type, and the derivate load (Jenkins et al., 1981). It thus has limited applicability in assessing the PPGR to real-life meals consisting of art

INTERindividual PPGR differences



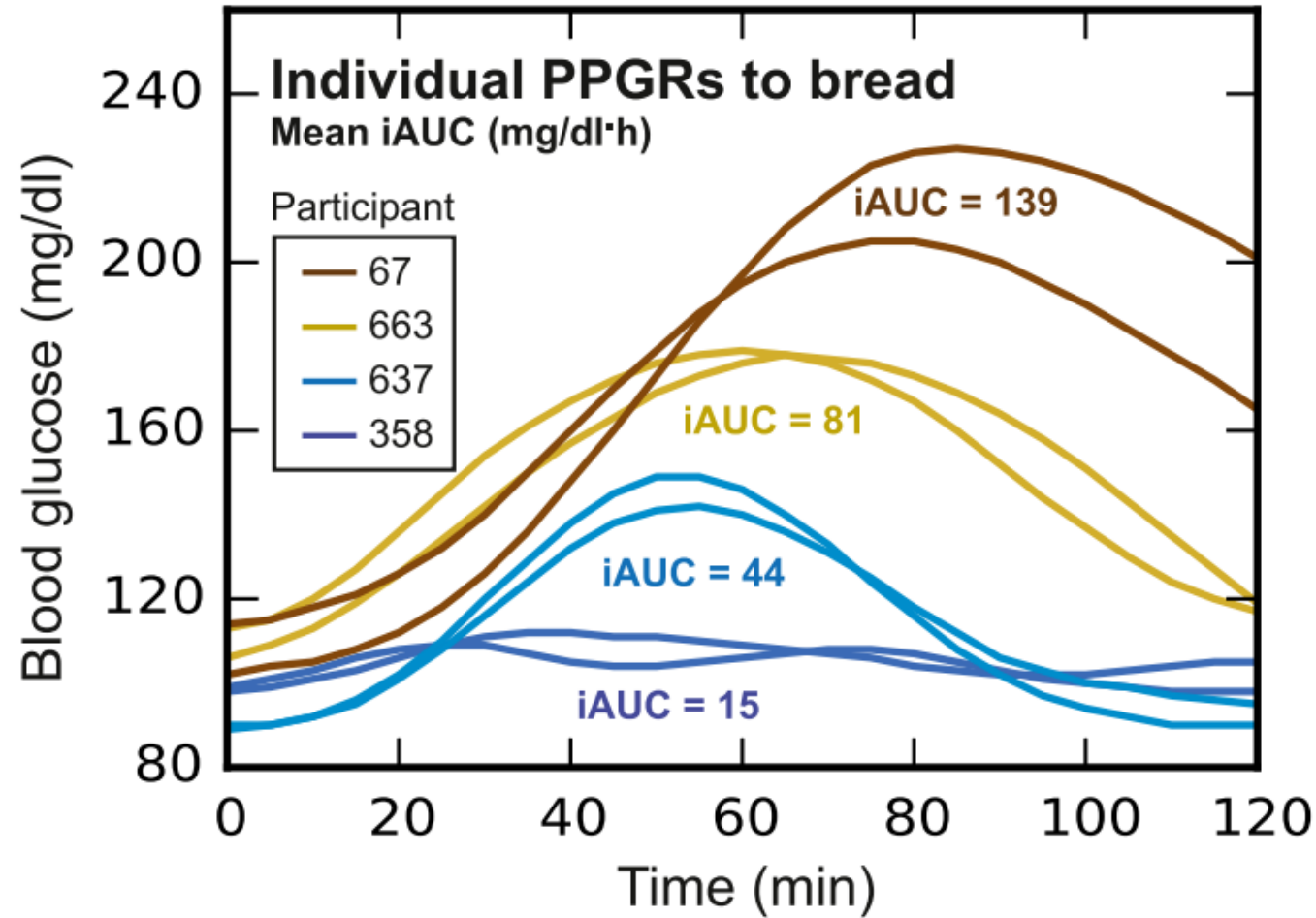
Ingestion of two of the repeated meals result in opposite blood glucose response in two participants



Ingestion of two free meals result in opposite blood glucose response in two participants



INTER- and INTRA- individual PPGR differences

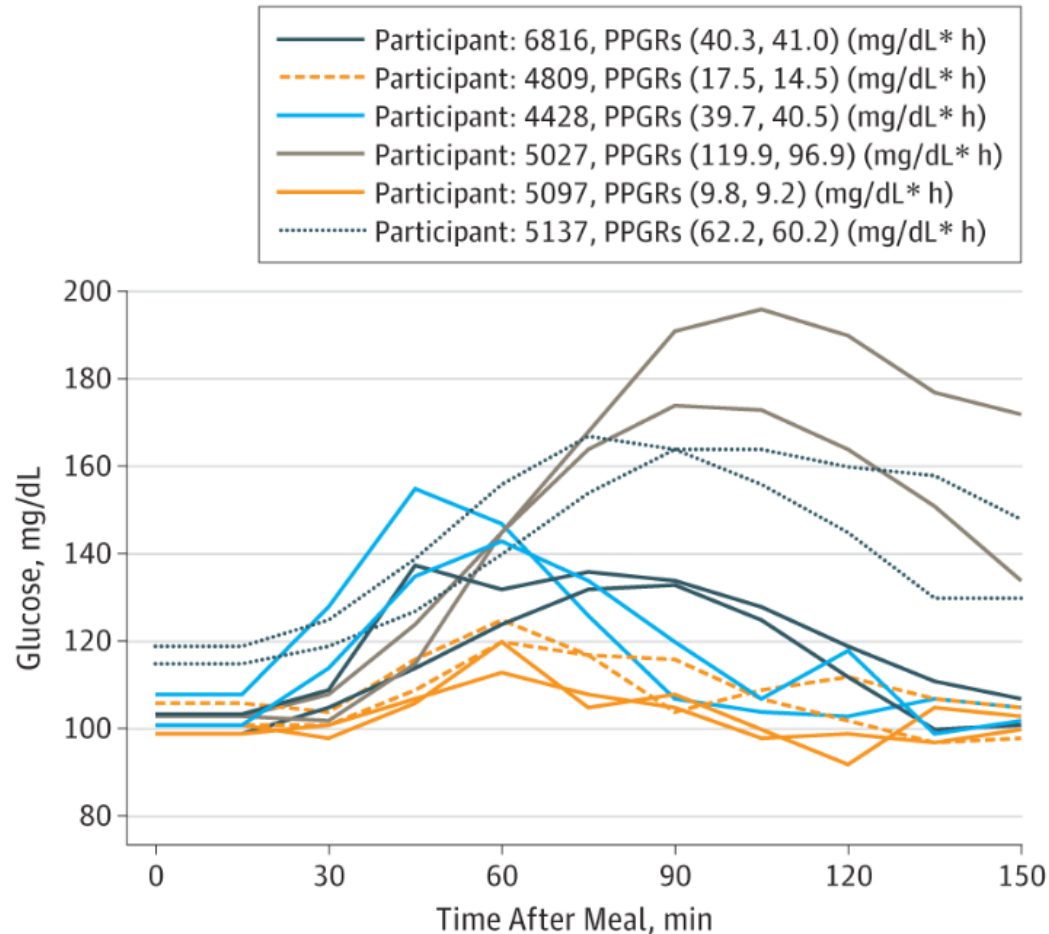


Example of high interpersonal variability and low intra-personal variability in the PPGR to bread across four participants (two replicates per participant consumed on two different mornings).



INTER- and INTRA- individual PPGR differences

A Glycemic responses to food

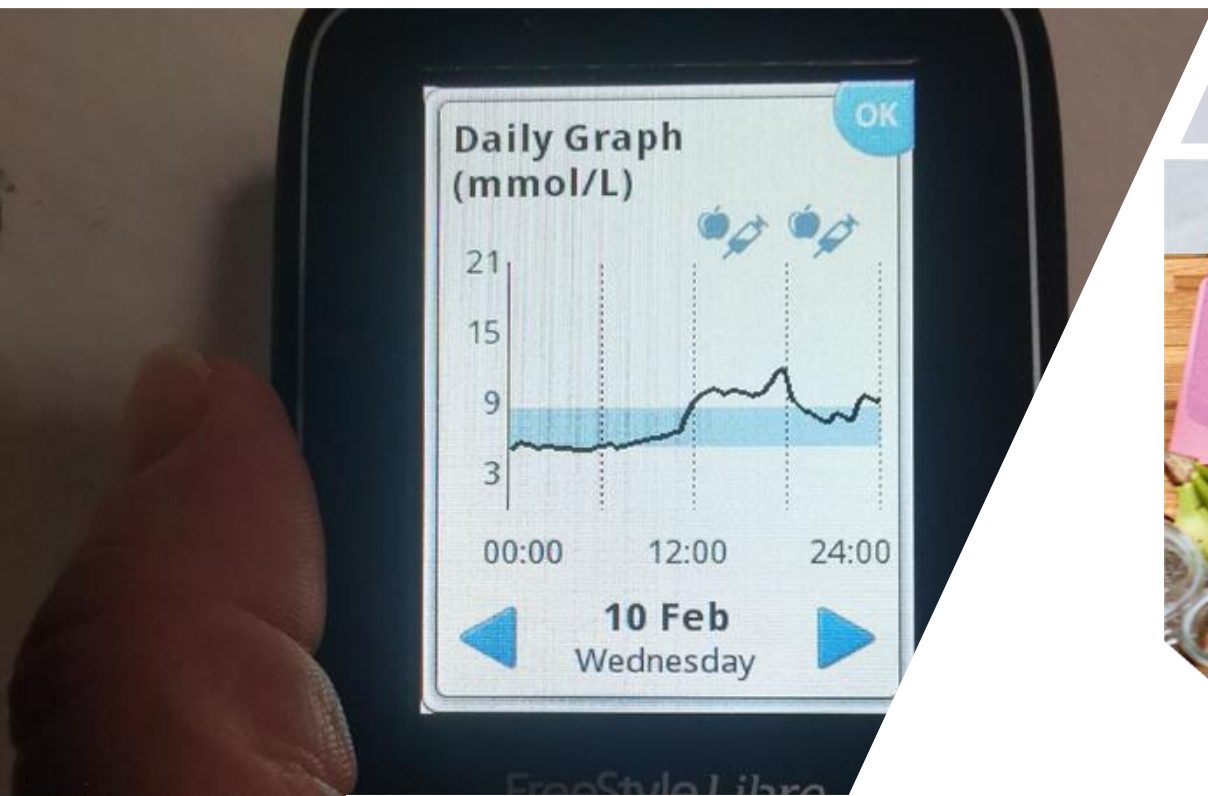


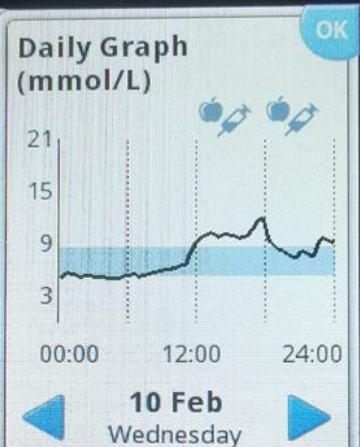
Intraindividual and interindividual variability in response to the bagel and cream cheese meal.

The key shows the participant number and the computed postprandial glycemic response (PPGR) for meals eaten by the same participant on different days.

Mendes-Soares H, Raveh-Sadka T, Azulay S, et al. Assessment to Predicting Postprandial Glycemic Responses to Food Among People With Diabetes. *JAMA Netw Open*. 2019;2(2):e188102.







14. 02. 2021. NEDJELJA
VALENTINOKO.

08.50^h - 12^h KAVA
18^h - 20^h KAVA
DORUČAK 12^h - 12.20^h
150 gr. jog. s borovnicama
+ 1 žlica sezams
+ mješav. mrs. oko 50gr
+ 1 štrudla od sira
VJEČ. D 13^h
RUCIAK 14.30 - 15^h
3 žlice bakalarske grahove
2 krah. malobruice peč.

14. 02. 2021. NEDJELJA
VALENTINOKO.

07.30^h (4.4) NATAŠTE
08.35^h 5.7.
13.20^h 5.5 1h ispa
14.20^h (5.9) 1h ispa
16.25^h 6.0 1.5h ispa R
17^h (5.9) 2h ispa R
19.20^h 6.3 1h ispa V
20.30^h (5.3) 2.10' uležav.
22.05^h 5.3 uležav. V
20.40^h 5.0 pred spav. NOĆ

07. 02.

UMBIRMA S
YUKOUM
HELENA
OJIA, LAN

24. 02. 2021
17-dana -61

TLAK 129/61/79
08.03 ⇒ 4.4 →
09.25 ⇒ 4.3 → - 1/2 naranče +
4 žlice smutija od voća
(TABLETE)
Kava + mlijeko 2 del
10.18 ⇒ 6.0 → 1/2 šnite polu bijelog
kruha + sirni namaz
10.59 ⇒ 4.8 → - SAXENDA - 1,8mg (5)
13.36 ⇒ 4.5 →
13.49 ⇒ 4.1 → - 3 žlice nemasne
vite, 1 kom. Pohanog manji + 1 žlica
crvenog luka posyčanog + 1 dc crn. ole
17.18 ⇒ 4.8 → - ka pu oino

18.08 ⇒ 4.6 →
18.40 ⇒ 4.6 →
19.25 ⇒ 5.0 → - 2 del domaćeg oja
med + limun (TABLETE)

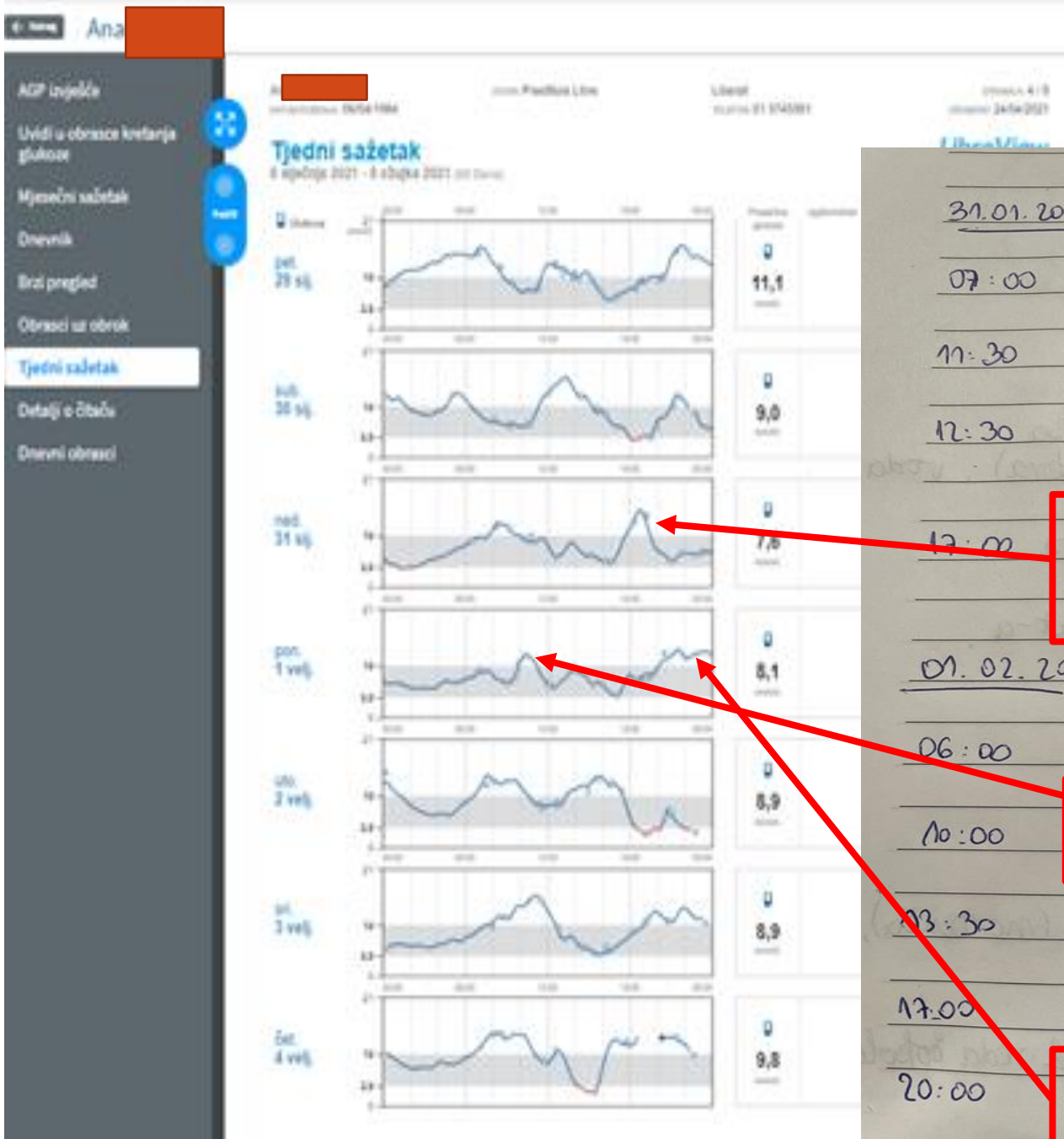
18-dan -58 (+93)
25. 02. 2021.
Kg 121,3

TLAK - 113/51/79
05.28 ⇒ 4.6 →
06.51 ⇒ 4.9 → - 1 naranča (TABLETE)
Kava + mlijeko 2 del
08.19 ⇒ 4.3 → - 1 klementina
09.54 ⇒ 4.4 → - riža i patarisi 4 žlice
1/2 pohane šnite + krastavci + luk +
vrhnje 1 žlica
10.59 ⇒ 4.5 → SAXENDA - 1,8mg (5)
11.55 ⇒ 4.1 → - 1 žlica riže + patarisi,
1/2 šnite pohane + krastavci luk - 1 žlica
14.02 ⇒ 4.2 → 1/2 jabuka
16.39 ⇒ 4.5 → 1/2 jabuka
18.49 ⇒ 4.3 → - manju zdjelicu
griža na mlijeku + 3 kocke obalede
(TABLETE)

- ZELENA SARADJA

16³⁰ - DESETAK BADEMA, MALI KURSKA
- DROŠKI ČAJ OD RUČKA DO VEČERE 3 JALICE
19⁰⁰ - VEČERA
- SIR TRAPIST, ŠNITICA PILE
KRUHA
- POLA JALICE KEFIRNA
SAMA (KEFIRNA TRNCA 1





31.01.2021.

07:00 sir i vrhnje, 4 snate dinje

11:30 kakao od bademovog mlijeka (bez šećera)

12:30 juha od teleće koljenice, lišo blitva i batat, češnjak

12:00 2 sendviča sa sirom, šunkom, majonezom, krastavcima, putrom

01.02.2021.

06:00 2 kuhana jaja, kava, rotkvice, sir

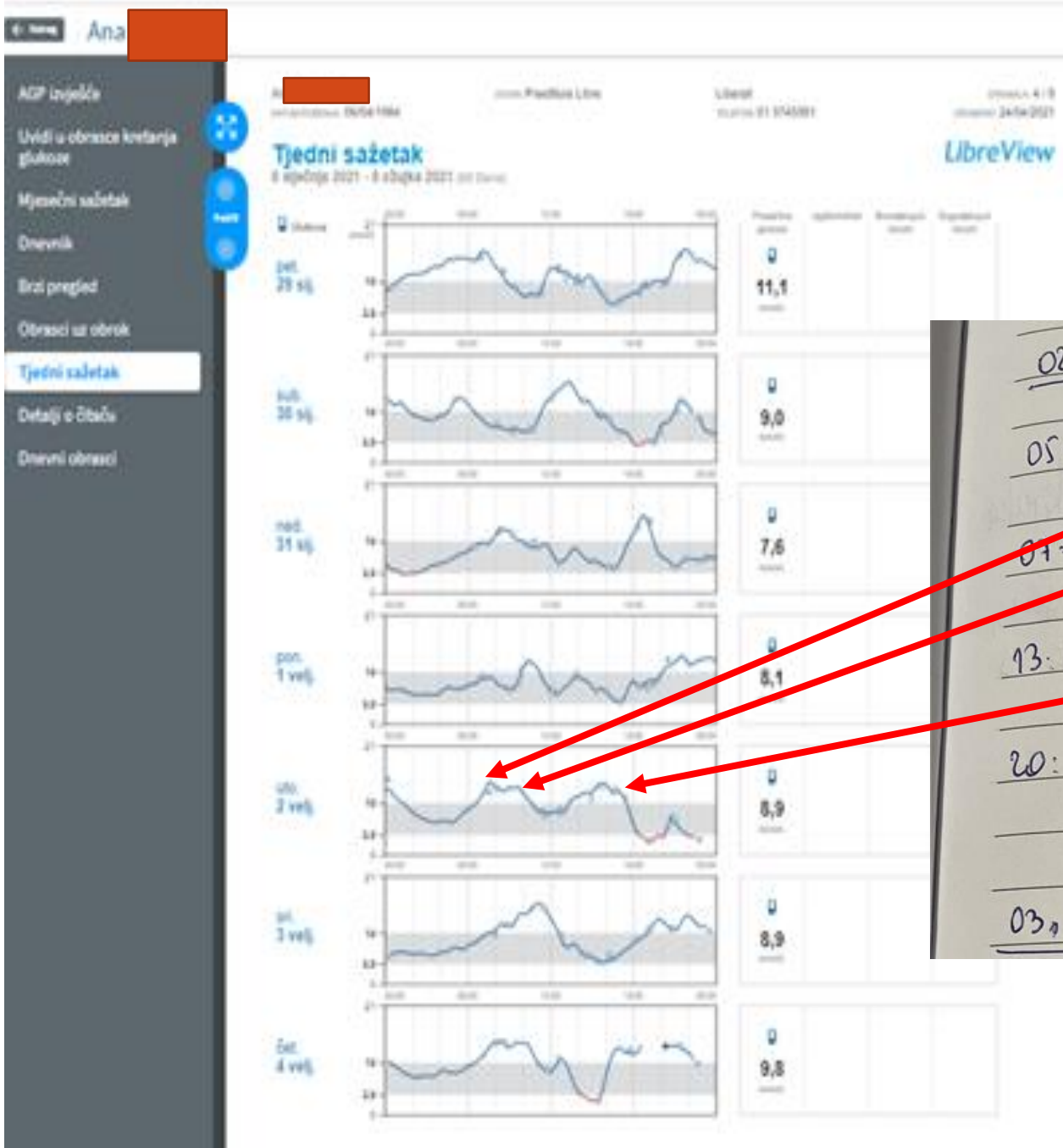
10:00 jabuka, banana, šaka lješnjaka

13:30 lignje sa žara, blitva, češnjak

17:00 3 rižina krekeri

20:00 lasagnje s mesom i sirom





02. 02. 2021.

05:30 krafna, kroasan, Salica kakao

07:00 pudding vanilija (Vindija)

13:00 čevapi i lepinja, bezalkoholna piva

20:00 sir i vthnje

03. 02. 2021.



06/02 08,30 JABUKA ŠAKA ORAHA TVRDI SIR
 12,50 RUČAK KISELO ZELJE KRANJSKA
 15,30 SNACK SVJEŽI SIR I MORTADELA
 16,30 KRANJSKA SALATA
 20,40 KETO SLASTICA

Glukoza mmol/L

Ugljikohidratni gram

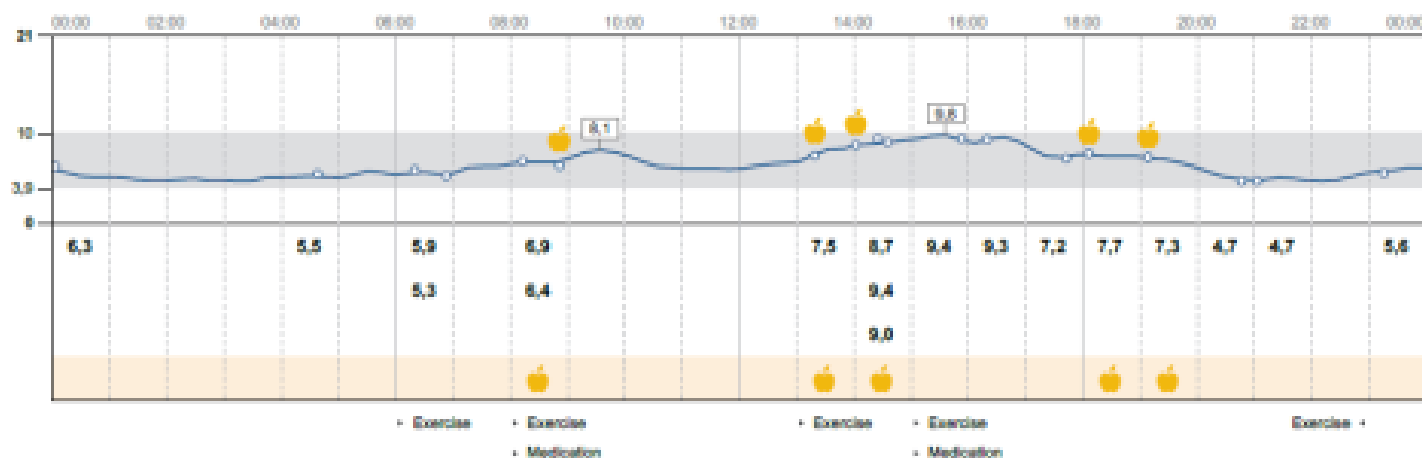
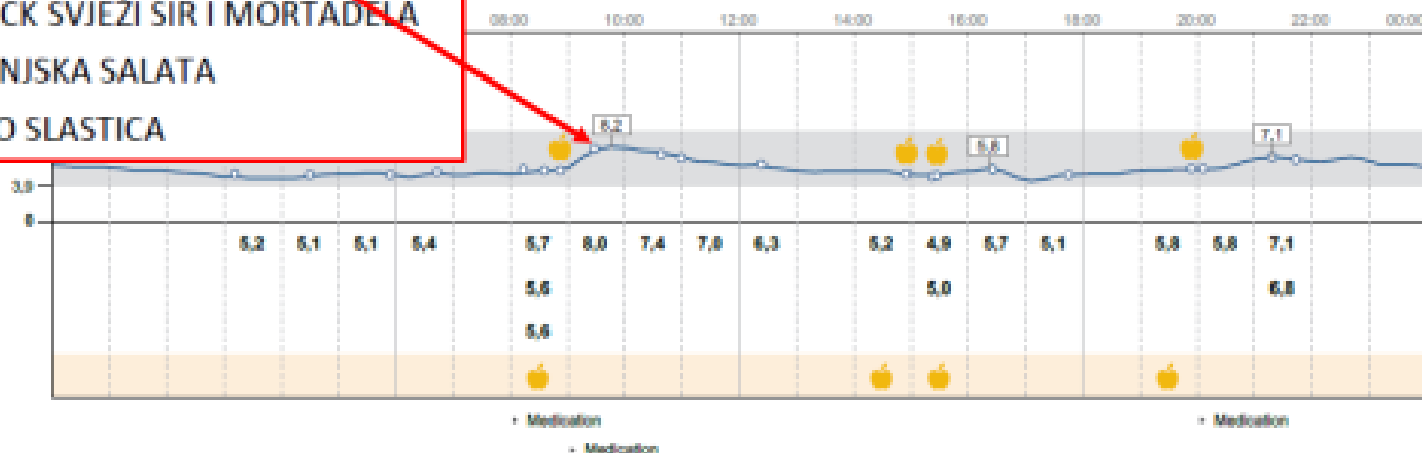
Bilješke

NED. 7 velj.

Glukoza mmol/L

Ugljikohidratni gram

Bilješke



06/02 08,30 JABUKA ŠAKA ORAHA TVRDI SIR
 12,50 RUČAK KISELO ZELJE KRANJSKA
 15,30 SNACK SVJEŽI SIR I MORTADELA
 16,30 KRANJSKA SALATA
 20,40 KETO SLASTICA

Glukoza mmol/L

Ugljikohidratni grama

Bilješke

NED. 7 velj.

Glukoza mmol/L

Ugljikohidratni grama

Bilješke

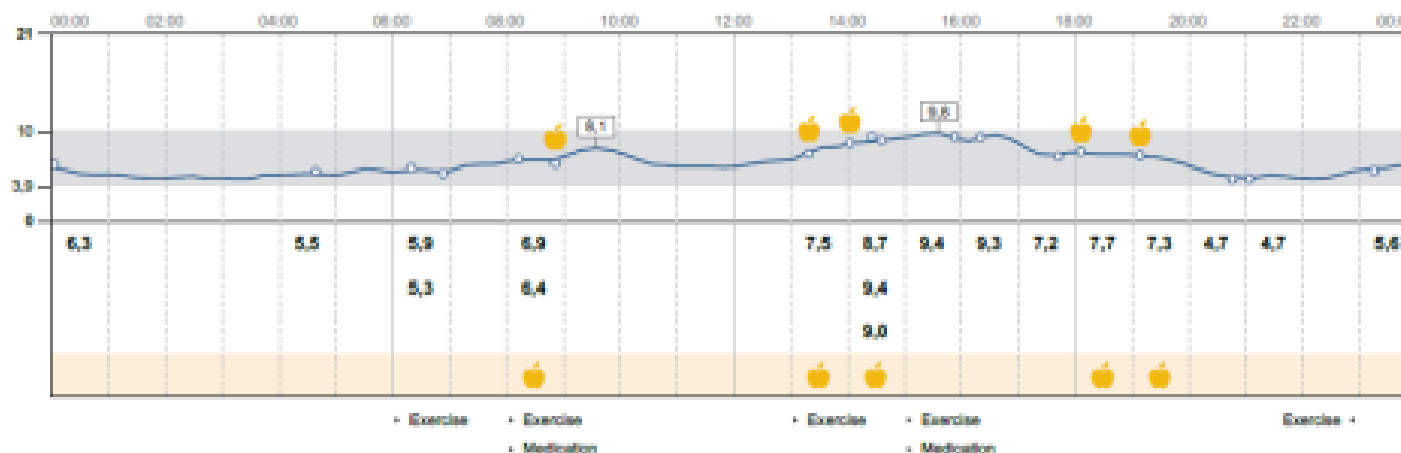
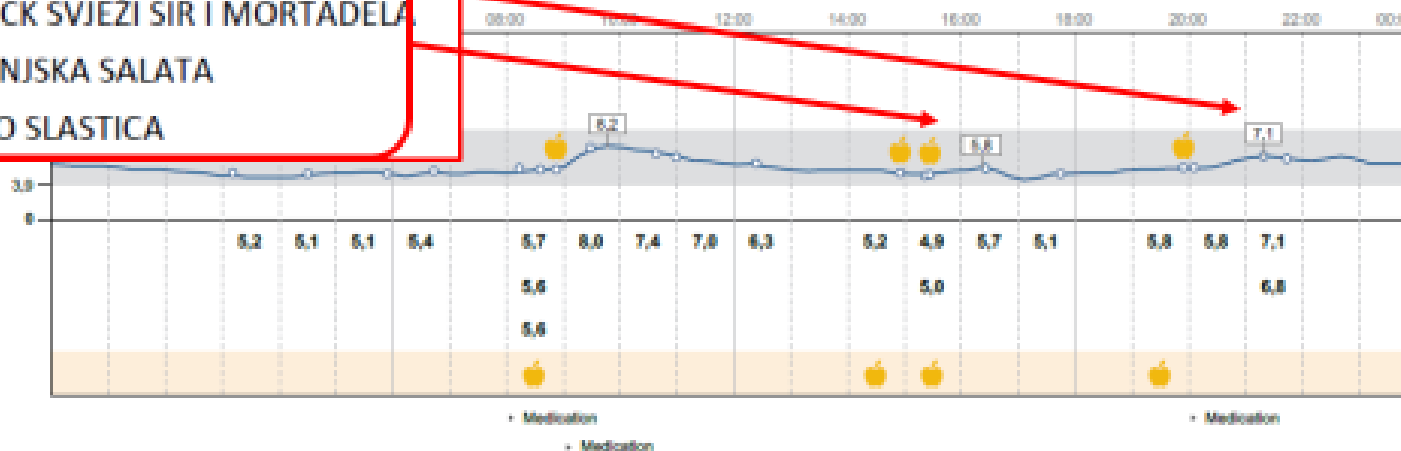


Table 1. Dietary strategies and potential health benefits for Metabolic Syndrome (MetS).

Dietary Pattern		Nutritional Distribution	Improvements in MetS Criteria	Ref.
Mediterranean diet		<ul style="list-style-type: none"> 35–45% kcal/d from total fat (mainly MUFA ¹, EVOO and nuts being the principal source) 35–45% kcal/d from CH 15–18% kcal/d from protein 	Reduction of CVD incidence and outcomes	[22,23,24,25,26,27,28,29]
			Decreased BP (systolic and diastolic)	[15,26]
			Inverse association with mortality	[24,30]
			Improvements in dyslipemia	[26]
			Decreased incidence of T2DM	[12,22,23,29,31]
DASH diet		<ul style="list-style-type: none"> Total fats 27% kcal/d Saturated fats 6% kcal/d Dietary cholesterol CH 55% kcal/d Proteins 18% kcal/d 	Reduction of BP (systolic and diastolic)	[32,33]
			Reduction in BMI and waist circumference	[34,35]
			Improvement in cardiometabolic profile	[36,37,38,39]
			Reduction in T2DM incidence	[40]
Plant-based diets		<ul style="list-style-type: none"> Reduction or restriction of animal-derived foods High intake of plant-source foods Fat profile rich in UFAs 	Reduction of BP (systolic and diastolic)	[41,42]
			Decreased body weight and risk of obesity	[43,44,45]
			Reduction of the risk of CVD	[46]
			Decreased all-cause mortality	[43,47,48]
Low CH diets and very low CH diets (ketogenic diets)		<ul style="list-style-type: none"> <50% kcal/d from carbohydrates and <10% kcal/d from CH in ketogenic diets High protein (20–30% kcal/d) High fat intake (30–70% kcal/d) 	Weight loss and weight-loss maintenance	[49,50,51,52]
			Reduction of DBP	[52]
			Reduction of LDL-c and triglycerides levels	[49,50,51]
			Increase of HDL-c levels	[49,50,51]
			Improvements in insulin resistance	[53,54]
Low-fat diet		<ul style="list-style-type: none"> <30% kcal/d from total fat (<10% of saturated fat) 15–17% kcal/d from protein 50–60% kcal/d from CH 	Reduction of BP (systolic and diastolic)	[33,55]
			Short-term improvement of cholesterol profile	[33,55]
			Short-term weight loss	[55]
			Reduced risk of all-cause mortality	[56]
High protein diet		<ul style="list-style-type: none"> High protein (20–30% kcal/d) or 1.34–1.50 g/Kg body weight/d from protein Low CH (40–50% kcal/d) 	Reduction of triglycerides levels	[57,58]
Other dietary patterns and strategies	Nordic diet	<ul style="list-style-type: none"> High content of whole-grain high-fibre products Low in meat and processed foods 	Reduction of BP (systolic and diastolic)	[59]
			Increase of HDL-c levels	[59]
	Intermittent fasting	<ul style="list-style-type: none"> Fasting for a long period of time 	Weight loss	[60,61,62]
			Improvements in insulin resistance	[60,61,62]
			Improvements in dyslipidaemia	[60,61,62]
			Reduction of BP (systolic and diastolic)	[60,61,62]
			Decreased risk of T2DM	[63]
			Decreased risk of CVD	[63]

Dietary strategies and potential health benefits for Metabolic Syndrome

Castro-Barquero S, Ruiz-León A, Sierra-Pérez M, Estruch R, Casasnovas J. Dietary Strategies for Metabolic Syndrome: A Comprehensive Review. *Nutrients*. 2020; 12(10): <https://doi.org/10.3390/nu1210>





DASH DIET

DASH diet

- Total fats 27% kcal/d
- Saturated fats 6% kcal/d
- Dietary cholesterol
- CH 55% kcal/d
- Proteins 18% kcal/d

Reduction of BP (systolic and diastolic) [32,33]

Reduction in BMI and waist circumference [34,35]

Improvement in cardiometabolic profile [36,37,38,39]

Reduction in T2DM incidence [40]

Filippou, C.D.; Tsioufis, C.P.; Thomopoulos, C.G. et al. Dietary Approaches to Stop Hypertension (DASH) Diet and Blood Pressure Reduction in Adults with and without Hypertension: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. *Adv. Nutr.* 2020.

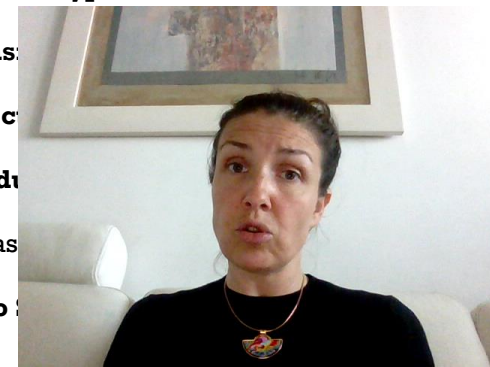
Schwingshackl, L.; Chaimani, A.; Schwedhelm, C.; et al. Comparative effects of different dietary approaches on blood pressure in hypertensive and pre-hypertensive individuals: A systematic review and network meta-analysis. *Crit. Rev. Food Sci. Nutr.* 2019, 59, 2674–2687.

Phillips, C.M.; Harrington, J.M.; Perry, I.J. Relationship between dietary quality, determined by DASH score, and cardiometabolic health biomarkers: A cross-sectional study of adults. *Clin. Nutr.* 2019, 38, 1620–1628.

Soltani, S.; Shirani, F.; Chitsazi, M.J.; Salehi-Abargouei, A. The effect of dietary approaches to stop hypertension (DASH) diet on weight and body composition in adults: A systematic review and meta-analysis of randomized controlled clinical trials. *Obes. Rev.* 2016, 17, 442–454.

Jones, N.R.V.; Forouhi, N.G.; Khaw, et al. Accordance to the Dietary Approaches to Stop Hypertension diet pattern and cardiovascular disease in a British, population-based cohort. *Epidemiol.* 2018, 33, 235–244.

Schwingshackl, L.; Bogensberger, B.; Hoffmann, G. Diet Quality as Assessed by the Healthy Eating Index, Alternate Healthy Eating Index, Dietary Approaches to Stop Hypertension Index, and Health Outcomes: An Updated Systematic Review and Meta-Analysis of Cohort Studies. *J. Acad. Nutr. Diet.* 2018, 118, 74–100





PLANT BASED DIETS

Plant-based diets

- Reduction or restriction of animal-derived foods
- High intake of plant-source foods
- Fat profile rich in UFAs

Reduction of BP (systolic and diastolic)

[41,42]

Decreased body weight and risk of obesity

[43,44,45]

Reduction of the risk of CVD

[46]

Decreased all-cause mortality

[43,47,48]

Decreased risk of T2DM

[43,47,48]

Hemler, E.C.; Hu, F.B. **Plant-Based Diets for Cardiovascular Disease Prevention: All Plant Foods Are Not Created Equal.** *Curr. Atheroscler. Rep.* **2019**, *21*, 18.
Yokoyama, Y.; Nishimura, K.; et al. . **Vegetarian diets and blood pressure: A meta-analysis.** *JAMA Intern. Med.* **2014**, *174*, 577–587.
Huang, R.Y.; Huang, C.C.; Hu, F.B.; Chavarro, J.E. **Vegetarian Diets and Weight Reduction: A Meta-Analysis of Randomized Controlled Trials.** *J. Gen. Intern Med.* **2019**, *54*, 100–107.
Konieczna, J.; Romaguera, D.; et al. **Longitudinal association of changes in diet with changes in body weight and waist circumference in subjects at high cardiovascular risk: the** *PREDIMED trial.* *Int. J. Behav. Nutr. Phys. Act.* **2019**, *16*, 139.
Kahleova, H.; Salas-Salvadó, J.; **Rahelić, D.** et al. **Dietary Patterns and Cardiometabolic Outcomes in Diabetes: A Summary of Systematic Reviews and Meta-Analyses.** *Diabetes Care.* **2020**, *43*, 100–110.
Orlich, M.J.; Singh, P.N.; et al. **Vegetarian dietary patterns and mortality in Adventist Health Study 2.** *JAMA Intern. Med.* **2013**, *173*, 1230–1238.
Kim, H.; Caulfield, L.E.; et al. **Healthy Plant-Based Diets Are Associated with Lower Risk of All-Cause Mortality in US Adults.** *J. Nutr.* **2018**, *148*, 624–631.





LCHF AND VLCHF DIETS

Low CH diets and very low CH diets (ketogenic diets)	<ul style="list-style-type: none"><50% kcal/d from carbohydrates and <10% kcal/d from CH in ketogenic dietsHigh protein (20–30% kcal/d)High fat intake (30–70% kcal/d)	Weight-loss and weight-loss maintenance	[49,50,51,52]
		Reduction of DBP	[52]
		Reduction of LDL-c and triglycerides levels	[49,50,51]
		Increase of HDL-c levels	[49,50,51]
		Improvements in insulin resistance	[53,54]
		Reduction of HbA1c levels	[49,51]

Bazzano, L.A.; Hu, T.; Reynolds, K.; et al. **Effects of low-carbohydrate and low-fat diets: A randomized trial.** *Ann. Intern. Med.* **2014**, *161*, 309–318.

Van Zuuren, E.J.; Fedorowicz, Z.; Kuijpers, T.; Pijl, H. **Effects of low-carbohydrate- compared with low-fat-diet interventions on metabolic control in people with type 2 diabetes: A systematic review including GRADE assessments.** *Am. J. Clin. Nutr.* **2018**, *108*, 300–331.

Bueno, N.B.; de Melo, I.S.; de Oliveira, S.L.; da Rocha Ataíde, T. **Very-low-carbohydrate ketogenic diet v. low-fat diet for long-term weight loss: A meta-analysis of randomized controlled trials.** *Br. J. Nutr.* **2013**, *110*, 1178–1187.

Livesey, G.; Taylor, R.; Livesey, H.F et al. **Dietary Glycemic Index and Load and the Risk of Type 2 Diabetes: A Systematic Review and Updated Meta-Analyses of Cohort and Intervention Studies.** *Nutrients* **2019**, *11*, 1280.

Obesity and Weight Management for the Prevention and Treatment of Type 2 Diabetes: Standards of Care in Diabetes–2024. *Diabetes Care*, 2024, 47.Supplement 3.

Firman, C. H., Mellor, D. D., Unwin, D., & Brown, A. (2024). **Does a ketogenic diet have a place within diabetes clinical practice? Review of current evidence and clinical practice.** *Diabetes Therapy*, *15*(1), 77-97.





INTERMITTENT FASTING

Intermittent
fasting

- Fasting for a long period of time

Weight loss [60,61,62]

Improvements in insulin resistance [60,61,62]

Improvements in dyslipidaemia [60,61,62]

Reduction of BP (systolic and diastolic) [60,61,62]

Decreased risk of T2DM [63]

Decreased risk of CVD [63]

Most, J.; Gilmore, L.A.; Smith, S.R.; et al. **Significant improvement in cardiometabolic health in healthy nonobese individuals during caloric restriction-induced weight loss maintenance.** *Am. J. Physiol. Endocrinol. Metab.* **2018**, *314*, E396–E405.

de Cabo, R.; Mattson, M.P. **Effects of Intermittent Fasting on Health, Aging, and Disease.** *N. Engl. J. Med.* **2019**, *381*, 2541–2551.

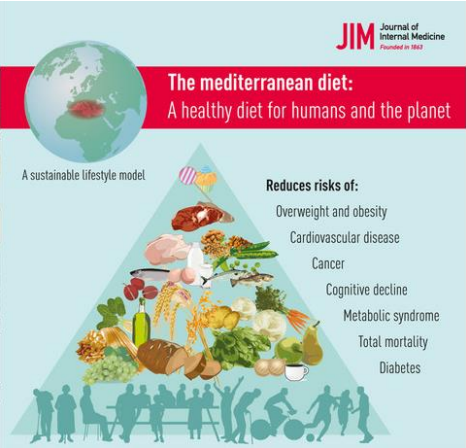
Albosta, M., Bakke, J. **Intermittent fasting: is there a role in the treatment of diabetes? A review of the literature and guide for primary care physicians.** *Clin Diabetes* (2021).

Dorothea, K.; Petra, C.; Markus, G.; Tibor, K. **Adherence to time-restricted feeding and impact on abdominal obesity in primary care patients: Results of a pilot study design.** *Nutrients* **2019**, *11*, 2854.

Sundfør, T.M.; Svendsen, M.; Tonstad, S. **Effect of intermittent versus continuous energy restriction on weight loss, maintenance and cardiometabolic risk: A randomized trial.** *Nutr. Metab. Cardiovasc. Dis.* **2018**, *28*, 698–706.

Borgundvaag, E., Mak, J., & Kramer, C. K. (2021). **Metabolic impact of intermittent fasting in patients with type 2 diabetes mellitus: a systematic review and meta-analytical study of interventional studies.** *The Journal of Clinical Endocrinology & Metabolism*, *106*(3), 902–911.





MEDITERRANEAN DIET

Mediterranean diet

- 35–45% kcal/d from total fat (mainly MUFA ¹, EVOO and nuts being the principal source)
- 35–45% kcal/d from CH
- 15–18% kcal/d from protein

Nutritional Distribution

Improvements in MetS Criteria

Ref.

- Reduction of CVD incidence and outcomes [22,23,24,25,26,27,28,29]
- Decreased BP (systolic and diastolic) [15,26]
- Inverse association with mortality [24,30]
- Improvements in dyslipemia [26]
- Decreased incidence of T2DM [12,22,23,29,31]

Pérez-Martínez, P.; Mikhailidis, D.P.; et al. **Lifestyle recommendations for the prevention and management of metabolic syndrome: An international panel recommendation.** *Nutr. Rev.* **2017**, *75*, 307–326.

Godos, J.; Zappalà, G.; Bernardini, S.; et al. **Adherence to the Mediterranean diet is inversely associated with metabolic syndrome occurrence: A meta-analysis of studies.** *Int. J. Food Sci. Nutr.* **2017**, *68*, 138–148

Franquesa, M.; Pujol-Busquets, G.; García-Fernández, E.; et al. **Mediterranean Diet and Cardiometabolic Syndrome: A Systematic Review through Evidence-Based Answers to Questions.** *Nutrients* **2019**, *11*, 655.

Finicelli, M.; Squillaro, T. et al. **Metabolic syndrome, Mediterranean diet, and polyphenols: Evidence and perspectives.** *J. Cell Physiol.* **2019**, *234*, 5807–5826.

Steffen, L.M.; Van Horn, L.; Davi, G.L.; et al. **A modified Mediterranean diet score is associated with a lower risk of incident metabolic syndrome over 25 years: The CARDIA (Coronary Artery Risk Development in Young Adults) study.** *Br. J. Nutr.* **2014**, *112*, 1654–1661.

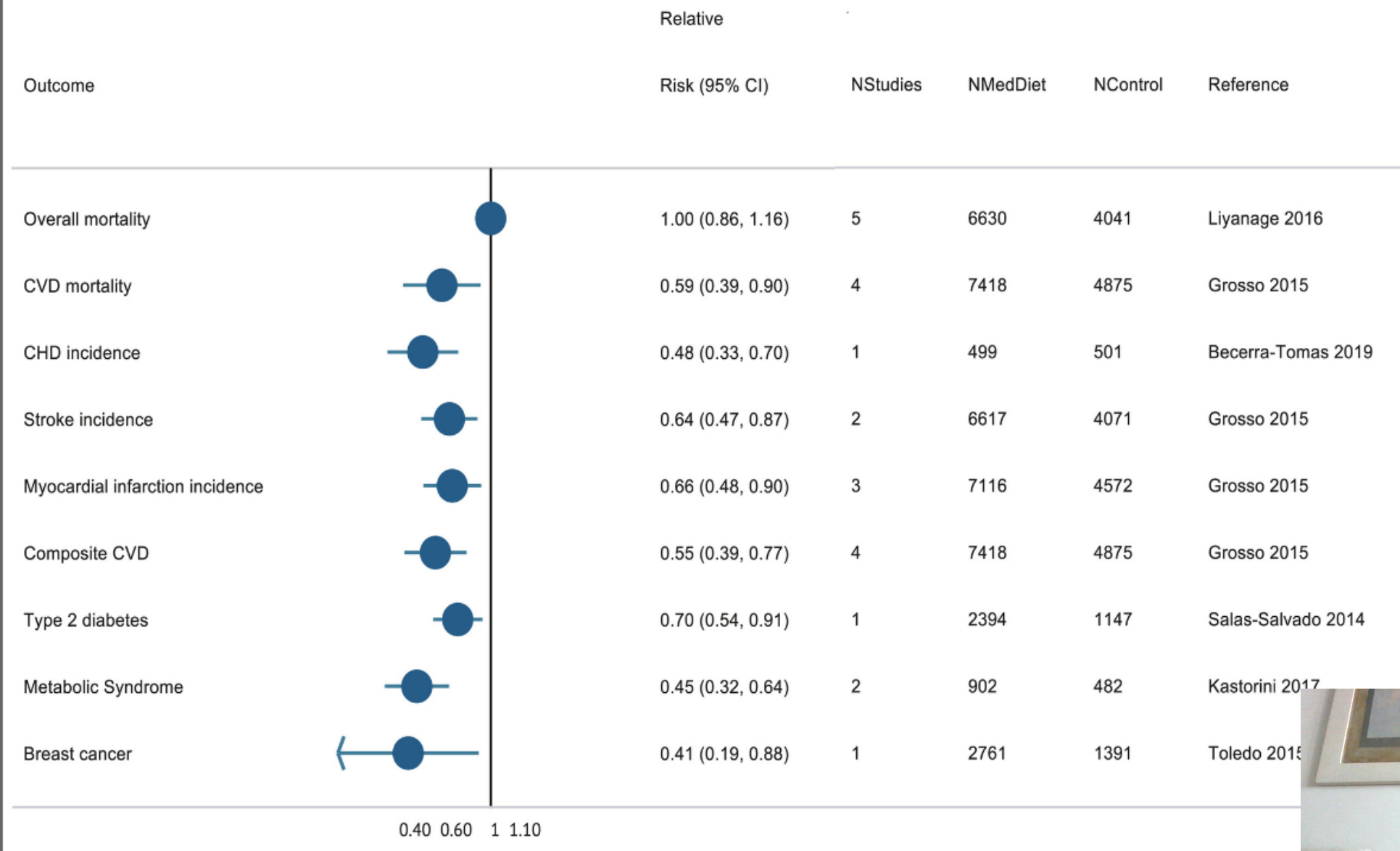
Sleiman, D.; Al-Badri, M.R.; Azar, S.T. **Effect of mediterranean diet in diabetes control and cardiovascular risk modification: A systematic review.** *Front. Public Health* **2020**, *8*, 582.

Tosti, V.; Bertozzi, B. et al. **Health Benefits of the Mediterranean Diet: Metabolic and Molecular Mechanisms.** *J. Gerontol. A Biol. Sci. Med. Sci.* **2018**, *73*, 318–326.

D. Vranesic Bender, K. Cernak, I. Kodvanj, L. Anzic, D. Ljubas Kelecic, Z. Krznaric, **A. M. Liberati Prso. Adherence to mediterranean diet is associated with better glycaemic control in patients with prediabetes and diabetes type 2**, Clinical Nutrition ESPEN, Volume 58, **2023**, Page 522, ISSN 2405-4577,



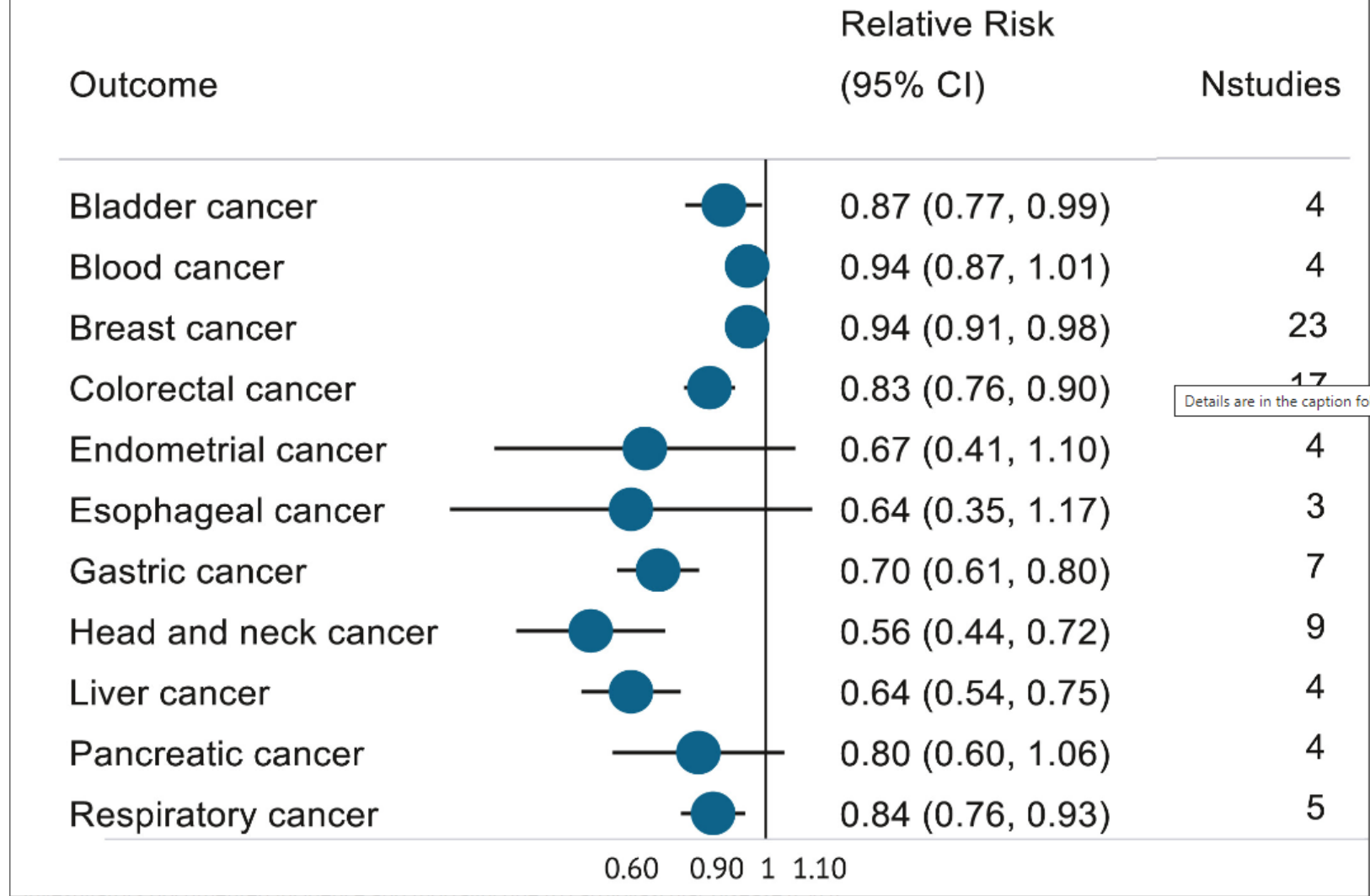
Mediterranean diet and Chronic Diseases



Guasch-Ferré, M., & Willett, W. C. (2021). The Mediterranean diet and health: A comprehensive overview. *Journal of internal medicine*, 290(3), 549-566.



Mediterranean Diet and Cancer



Guasch-Ferré, M., & Willett, W. C. (2021). The Mediterranean diet and health: A comprehensive overview. *Journal of internal medicine*, 290(3), 549-566.



Circulation
Volume 123, Issue 13, 3 April 2011; Pages 1023-1025
<https://doi.org/10.1161/CIRCULATIONAHA.110.192711>



AHA SCIENCE ADVISORY

Lyon Diet Heart Study
Benefits of a Mediterranean Diet
Heart Association Step I

Penny Kris-Etherton, Rob Bazzarre, and for the Nutrition Science Committee of the

Global Secondary Prevention Study
Event Recurrence

Results of the GOSPEL Study
From the Italian Cardiac

Pantaleo Giannuzzi, MD; Pier Luigi
Gianluigi Balestroni, PhD; Vincenzo
Raffaele Grillo, MD; Carlo Schweig
Franco Valagussa, MD; Diego Van

ORIGINAL INVESTIGATION

TO THE NEW ENGLAND JOURNAL OF MEDICINE

ORIGINAL ARTICLE

Primary Prevention of Cardiovascular Disease
with a Mediterranean Diet Supplemented
with Extra-Virgin Olive Oil or Nuts

R. Estruch, E. Ros, J. Salas-Salvadó, M.-L. Covas, D. Corella, F. Arós,
E. Gómez-Gracia, V. Ruiz-Gutiérrez, M. Fitó, J. Lapetra, R.M. Lamuela-Raventós,
L. Serra-Majem, X. Pintó, J. Basora, M.A. Muñoz, J.V. Sorlí, J.A. Martínez, M. Fitó,
A. Gea, M.A. Hernán, and M.A. Martínez-González,
for the PREDIMED Study Investigators*

MedDiet inscribed by UNESCO on
the Representative List of Intangible
Cultural Heritage of Humanity

Spain, Greece; Italy, Marocco, **Croatia**,
Portugal, Cyprus

2010.

1948

Greece
(Greek Governme
nt)

1958-1964

**Seven
Countries
Study**

1975

'How to eat
well and stay
well. The
Mediterrane
an way'

1992,
2001/2002,
2009

2013.



MEDDIET - A LIFESTYLE



- the combination of a healthy diet with social behaviours and the way of life of Mediterranean regions makes the MedDiet a sustainable lifestyle model that could likely be followed in other regions with country-specific and culturally appropriate variations.

Guasch-Ferré, M., & Willett, W. C. (2021). The Mediterranean diet and health: A comprehensive overview. *Journal of internal medicine*, 290(3), 549-566.

