Anthropometric and adiposity indicators and risk of type 2 diabetes: systematic review and dose-response meta-analysis of cohort studies

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Appendix 1: Text S1, Tables S1-S9, and Figures S1-S27

Text S1. Detailed description of GRADE domains and how to judge each domain.

We evaluated the certainty of evidence for each association using the updated Grading of Recommendations Assessment, Development and Evaluations (GRADE) tools, which integrates the application of ROBINS-I. [1] GRADE rates the certainty of evidence as high, moderate, low, or very low. [2] In the updated GRADE tool, observational studies also start at a high certainty of evidence level. The criteria used to downgrade evidence include study limitations as assessed by ROBINS-I tool, [3] inconsistency (substantial unexplained between-study heterogeneity, $I^2 \geq 50\%$ and $P_{heterogeneity} < 0.10$), [4] indirectness (presence of population, intervention or comparator factors that limit the generalizability of the results), [5] imprecision (the 95% CIs are wide, the optimal information size was not met, or the point estimate does not surpass the minimally important difference), [6] and compelling evidence of publication bias. [7] To determine the presence of imprecision, we first considered the optimal information size (the number of cases included in the review compared with the number required by a conventional sample size calculation for a single adequately powered trial. On the basis of a 5 % event rate in the control group and a 25 % relative risk reduction, we calculated the optional information size to be 400 cases. [6] The outcome was also downgraded for imprecision if the optimal information size criterion was met but the 95 % CI included 1·00 and failed to exclude important harm (RR>1.25) and benefit (RR<0.75).

The criteria used to upgrade evidence include a dose-response gradient and large effect size. Large and very large effect sizes were defined as RR>2.00 and >5.00, respectively. [8] The evidence was upgraded to two levels if the effect sizes surpassed the threshold settled as very large effect size (RR>5.00) either in the linear or non-linear dose-response meta-analyses. We upgraded to two levels if the effect sizes surpassed 5.00 at any specific dose of exposure in the non-linear dose-response meta-analyses.

Table S1. Search strategy to find potential relevant articles for inclusion in the meta-analysis of anthropometric measures and risk of type 2 diabetes.

PubMed (53,033)
1. obesity [All fields] OR adiposity [All fields] OR fatness [All fields] OR overweight [All fields] OR “waist circumference” [All fields] OR “hip circumference” [All fields] OR “thigh circumference” [All fields]
2. “waist-to-hip ratio” [All fields] OR “waist-to-height ratio” [All fields] OR “waist-to-thigh ratio” [All fields] OR “body adiposity index” [All fields] OR “body shape index” [All fields] OR “body mass index” [All fields]
3. WC [All fields] OR WHR [All fields] OR WHtR [All fields] OR WTR [All fields] BAI [All fields] OR ABSI [All fields] OR BMI
4. “fat mass” [All fields] OR “fat free mas” [All fields] OR “body fat” [All fields] OR “body fat percentage” [All fields] OR “lean mass” [All fields]
5. “visceral fat” [All fields] OR “subcutaneous fat” [All fields] OR “body composition” [All fields]
6. prospective* [All fields] OR longitudinal [All fields] OR retrospective [All fields] observation [All fields] OR observational [All fields] OR cohort* [All fields]
7. follow-up [All fields] OR nested [All fields] OR “relative risk” [All fields] OR “hazard ratio” [All fields] OR “odds ratio” [All fields]
8. diabet* [Title/Abstract] OR Diabetes Mellitus [Mesh] OR Diabetes Mellitus, Type 2 [Mesh]
9. maternal [Title] OR pregnancy [Title] OR pregnant [Title] OR mother* [Title] OR child* [Title] OR gestation* [Title]
10. 1 OR 2 OR 3 OR 4 OR 5
11. 6 OR 7
12. 8 AND 10 AND 11
13. 12 AND NOT 9
Scopus (65,078)
Web of Science (10,135)
All: 119246

Table S2. List of studies excluded via full-text assessment and studies included in the analyses.

Excluded
Not relevant exposure (n=569) [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]
Duplicate (n=70) [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]
Not sufficient information (n=77) [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]
No risk estimate (n=36) [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]
Self-reported anthropometry (n = 30) [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]
Cross-sectional (n=25) [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]
In adolescences (n=18) [816,817,818,819,820,821,822,823,824,825,826,827,828,829,830,831,832,833]
Review study (n=14) [834,835,836,837,838,839,840,841,842,843,844,845,846,847]
Case-control study (n=13) [848,849,850,851,852,853,854,855,856,857,858,859,860]
Not relevant outcome (n=11) [861,862,863,864,865,866,867,868,869,870,871]
In patients with pre-diabetes (n=9) [872,873,874,875,876,877,878,879,880]
No 95%CI (n=6) [881,882,883,884,885,886]
In diseased populations (n=4) [887,888,889,890]
Nested case-control study (n=3) [891,892,893]
Case-cohort study (n=2) [894,895]
Letter (n=2) [896,897]
In athletes (n=1) [898]
Included
All cohort studies (n=212 publications with 216 cohorts) [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]
Body mass index (n=178 publications with 182 cohorts) [900,901,902,903,904,905,906,907,908,909,910,911,912,915,917,918,919,921,922,923,924,926,927,928,929,930,931,933,935,937,938,939,941,942,943,944,945,946,947,949,950,951,952,954,955,956,957,958,959,960,961,962,963,964,965,966,967,968,969,970,971,972,974,978,979,980,981,982,983,984,985,988,990,991,992,993,994,995,997,998,999,1001,1002,1003,1004,1005,1006,1007,1008,1010,1011,1012,1015,1016,1017,1018,1019,1020,1021,1023,1024,1025,1027,1028,1029,1030,1031,1032,1033,1034,1036,1037,1038,1039,1040,1043,1044,1045,1046,1048,1049,1050,1051,1052,1053,1054,1055,1056,1057,1058,1059,1060,1061,1062,1063,1064,1065,1066,1067,1069,1071,1073,1074,1075,1076,1077,1078,1079,1080,1081,1082,1083,1084,1085,1087,1088,1090,1091,1092,1093,1094,1095,1097,1098,1099,1102,1103,1104,1105,1106,1107,1109,1110]
Waist circumference (n=74 publications with 78 cohorts) [899,904,906,907,909,914,915,916,920,923,924,925,930,937,941,944,949,950,953,955,956,958,959,966,967,973,974,985,986,994,996,997,1001,1006,1007,1008,1011,1013,1014,1015,1018,1022,1023,1026,1034,1035,1037,1040,1042,1043,1047,1048,1052,1053,1058,1064,1066,1067,1072,1075,1077,1080,1083,1088,1093,1094,1098,1099,1100,1101,1103,1105,1106]
Waist-to-hip ratio (n=34) [899,909,923,926,930,950,952,953,956,958,966,974,985,1001,1005,1006,1008,1010,1015,1018,1030,1034,1040,1053,1064,1067,1075,1077,1088,1093,1098,1105,1106]

Waist-to-height ratio (n=25) [909 923 924 937 941 950 952 953 955 956 958 966 974 977 997 1001 1034 1053 1063 1066 1075 1098 1103 1105 1106]
Hip circumference (n=13 publications with 14 cohorts) [930 936 950 966 973 974 1000 1042 1043 1058 1064 1075 1093]
Visceral adiposity index (n=8 publications with 9 cohorts) [913 924 976 982 989 1086 1096 1106]
Body fat percentage (n=6) [915 932 994 997 1075 1105]
Thigh circumference (n=2) [1064 1075]
A body shape index (n=5) [955 956 959 1041 1108]
Body adiposity index (n=3 publications with 4 cohorts) [934 956 1058]

Table S3. Characteristics of cohort studies included in the meta-analysis of anthropometric measures and risk of type 2 diabetes.

Author, year, Country	Study name	Follow-up duration (years)	Gender	Participants/ cases	Age range (mean), years	Outcome identification method	Exposures	Adjustments
Adegbija, [899] 2015 Australia	Aboriginal community in Australia's Northern Territory	20	W/M	803/110	18-76 (33.5)	Hospitalization records	WC	Age, smoking status, alcohol drinking status
Aekplakorn, [900] 2006 Thailand	Electric Generation Authority of Thailand	12	W/M	2677/361	35-55 (42.4)	According to the ADA criteria (FPG or OGTT), as well as diagnosis and/or receipt of diabetes medication during the follow-up period	BMI, WC	Age, BMI, WC, hypertension, sibling or parent having diabetes, impaired fasting glucose, triglycerides, HDL cholesterol.
Alam, [901] 2020 Canada	Saskatchewan Rural Health Study (SRHS)	5	W/M	4330/119	18-74 (55)	Physician-, or primary caregiver-diagnosed, or self-reported diabetes status	BMI	Age, sex, residence type, people living at home, marital status, education level, education level, smoking, alcohol drinking status, exercise, comorbidity.
Appleton, [902] 2013 Australia	The North West Adelaide Health Study	7.9	W/M	4,056/112	18-84 (51)	Doctor-diagnosed or FPG ≥7.0 mmol/L	BMI	Age, sex, smoking, household income, highest education and physical activity, LDL cholesterol.
Ärnlov, [903] 2011 Sweden	Uppsala Longitudinal Study of Adults Men (ULSAM)	20	M	1,675/160	(50)	According to current WHO criteria (FPG ≥ 6.1 mmol/l at the baseline and 10-year, FPG ≥7.0 mmol/l) or FPG ≥7.0 mmol/l at the 20-year) or the use of antidiabetes medication	BMI	Age, smoking status, and level of physical activity
Asghar, [904] 2011 Bangladesh	Dhaka city called "Chandra"	5	W/M	2800/165	20-59 (41.2)	Fasting whole blood glucose level >7 mmol/L	BMI, WC, WHR	Age, sex, physical activity, blood pressure, monthly expenses, education
Bae, [905] 2020 Korea	The Korean Genome and Epidemiology Study-Ansan and Ansung study	8.1	W/M	8,900/1,258	40-69 (52.3)	Subjects who had any one of the following: (i) fasting plasma glucose ≥126 mg/dL; (ii) postprandial 2-h plasma glucose ≥200 mg/dL after a 75-g OGTT; and (iii) HbA1c ≥6.5%	BMI	Age, smoking, alcohol intake, regular exercise.

Balkau, [906] 2011 France	DESIR cohort	9	W/M	3,818/203	30-65 (47)	Treatment and/or FPG ≥7.0 mmol/L	BMI, WC	Age, sex, family history of diabetes, alcohol drinking, physical activity, hypertension, lipid treatment, waist circumference
Bancks, [907] 2017 US	CARDIA	24.5	W/M	4,251/504	18-30 (25)	Fasting glucose ≥126 mg/dL, postchallenge (75 g) glucose ≥200 mg/dL, HbA1c greater ≥6.5%, or use of diabetes medications	BMI, WC	Age, field center, mother's and father's educational attainment, and updated data for the participants' education, current employment status, paying for basic essentials, marital status, G statistic for racial segregation, tract-level percentage of population living in poverty, CES-Depression score, regular alcohol consumption, smoking status, diet score from the American Heart Association'a Life's Simple, regular physical activity, fasting glucose, body mass index, waist circumference, parental history of diabetes, triglycerides to high-density lipoprotein cholesterol ratio, forced vital capacity, systolic blood pressure, blood pressure–lowering medication use.
Berkowitz, [908] 2016 US	Eastern Massachusetts	11	W/M	3,174/200	(47)	Using data from an electronic health data repository or defined validated algorithm	BMI	Age, sex, education status, refugee, immigration, income, insurance.
Biggs, [909] 2010 US	The Cardiovascular Health Study	12.4	W/M	4,193/339	65-85 (72.6)	Used insulin or oral hypoglycemic agents, or had a fasting glucose level ≥126 mg/dL	BMI, WC, WHR, WHtR,	Age, race, current smoking, physical activity, diet score, and alcohol consumption.
Bjerregaard, [910] 2020	DynaHEALTH consortium	18.8	W/M	25,283/8,359	30-85	Plasma glucose ≥7 mmol/L and 2-h plasma glucose ≥11.1 mmol/L in a 2-h	BMI	Age, BMI, educational attainment, smoking, physical activity.

Demark and Finland						75-g OGTT or HbA1c ≥6.5% or 48 mmol/mol		
Bjørnholt, [911] 2000 Norway	Working in five companies	22.5	M	1,947/143	40-59	According to the 1985 WHO criteria that doctor affirmed	BMI	Age, sex, fasting blood glucose, family history of diabetes, fitness, triglycerides, cholesterol, systolic blood pressure.
Bonora, [912] 2004 Italy	The Bruneck Study	10	W/M	919/64	40-79	At baseline and at the 5-year follow-up, fasting glucose was ≥7 mmol/l (126 mg/dl) or when 2-h OGTT glucose was ≥11.1 mmol/l (200 mg/dl) or when the participants had a clinical diagnosis of the disease and treatment was ongoing (diet, drugs). At the 10-year follow-up fasting glucose was ≥7 mmol/l or when the individuals had a known clinical diagnosis of the disease	BMI	Age, sex, alcohol, smoking, physical activity, family history of diabetes, hypertension, dyslipidemia, hyperuricemia, impaired glucose test.
Bozorgmanesh, [913] 2011 Iran	Tehran Lipid and Glucose Study (TLGS)	6	W/M	5,964/369	(42.01)	FPG ≥7 mmol.l^{-1}, or 2h-PCPG≥11.1 mmol.l^{-1} or taking anti-diabetic medication	VAI	Age, sex, hypertension, family history of diabetes, smoking, physical activity, fasting plasma glucose, waist circumference, BMI, TG, HDL
Bragg, [914] 2018 China	China Kadoorie Biobank	9.2	W/M	512,891/13,416	30-79	Disease surveillance system for diabetes, and through diabetes diagnoses	WC	Stratified by age and study area and adjusted for education, income, occupation, smoking, alcohol consumption, physical activity, family history of diabetes
Brahimaj, [915] 2019 Netherlands	The Rotterdam Study	6.5	W/M	9,564/899	(64.7)	FPG ≥7.0 mmol/l, non-FPG ≥11.1 mmol/l (when fasting samples were unavailable) or use of blood glucose-lowering medication	BMI, WC, BF%	Age, systolic BP, treatment for hypertension, smoking and prevalent CVD, HDL-cholesterol, TG and serum lipid-reducing agents, fasting plasma glucose
Burke, [916] 2007 Australia	Australian Aborigines	12.9	W/M	514/104	15-88	Interview then confirmed with reference to medical records	WC	Age, sex, BMI, alcohol drinking.

Caerphilly collaborative group, [917] UK	Caerphilly Prospective Study (CaPS)	4.7	M	2034//99	(56.6)	Validated self-reported	BMI	Age, sex, physical activity, alcohol drinking, smoking status, family history of diabetes
Cameron, [918] 2021 US	Multi-Ethnic Study of Atherosclerosis (MESA)	9.2	W/M	4,200/486	45-84 (61)	Incident DM was defined as any observed DM case (untreated or treated) through examination 5 assessed at each follow-up visit	BMI	Age, sex, race/ethnicity, study site, physical activity, diet, annual family income, education level.
Carlsson, [919] 2007 Norway	Nord-Trøndelag Health Survey	11	W/M	38,800/738	18-79	Fasting blood glucose measured together with levels of C-peptide and anti-GAD antibody	BMI	Age, sex, smoking.
Carvalho, [920] 2020 Brazil	ELSA-Brasil study	3.7	W/M	4,463/366	35-74	Started receiving oral hypoglycemic agents or insulin; or (2) Self-reported information and laboratory measurements	WC	Age, sex, hypertension, dyslipidaemia, prior coronary artery disease, prior stroke, alcohol intake, lipid-lowering therapy, parental history of diabetes, creatinine clearance, waist circumference, blood pressure, HbA1c, hsCRP, fasting blood TG, HDL-cholesterol, LDLcholesterol.
Chan, [921] 2018 Singapore	SiMES, 2004–2006, SiMES-2, 2011–2013, and SINDI, 2007–2009, SINDI-2, 2012–2015	6	W/M	4,101/1320	(56.5)	Physician's diagnosis, use of insulin, use of oral hypoglycaemia medications or random plasma glucose ≥200 mg/dL or HbA1c ≥6.5% (48 mmol/mol)	BMI	Age, sex, ethnicity, family history of diabetes, income, education, current smoking status, systolic blood pressure, HbA1c, total cholesterol, HDL cholesterol, diabetes duration.
Chang, [922] 2016 Korea	The Kangbuk Samsung Health Study	4.1	W/M	74,509/472	(36.2)	Diabetes was defined either as a FPG ≥126 mg/dL, HbA1c ≥6.5%, or the use of blood glucose-lowering agents	BMI	Age, sex, center, year of screening exam, smoking status, alcohol intake, exercise habits, family history of diabetes, education level at baseline, glucose, systolic blood pressure, triglycerides, high-density lipoprotein cholesterol, homeostasis model assessment of insulin resistance, high-sensitivity C-reactive protein.

Chei, [923] 2007 Japan	Minami-Takayasu in two communities	10	W/M	5,617/550	40-69	FPG ≥126 mg/dL, or a 2-hour postload glucose level of ≥200 mg/dL or use of medication for diabetes	BMI, WC, WHR, WHtR	Age, sex, systolic blood pressure levels, alcohol intake, smoking status.
Chen, [924] 2014 China	The study of Prevention of Multiple Metabolic Disorders and Metabolic Syndrome in Jiangsu Province	5.8	W/M	3,461/160	35-74	FPG ≥7 mmol/L (or 126 mg/dL), or have been diagnosed as diabetes by a county-level hospital or above	BMI, WC, WHtR, VAI	Age, gender, SBP, DBP, smoking, alcohol drinking, family history of diabetes
Chen, [925] 2017 Taiwan	Healthy Aging Longitudinal Study (HALST)	3.1	W/M	5,349/247	55-64	Hospitalization for diabetes-related illness or prescription of antidiabetic drugs during follow-up; at least 1 prescription of oral antidiabetic agents and 1 ambulatory visit for diabetes-related illness within 1 year or at least 3 ambulatory visits for diabetes-related illness within 1 year	WC	SBP, TC, medication for high SBP
Chen, [926] 2003 Taiwan	Penghu	3	W/M	600/26	40-79 (57.4)	FPG ≥126 mg/dl (7.0 mmol/l)	BMI, WHR	Age, sex.
Chen, [927] 2018 China	Pinggu district of Beijing, China	1.7	W/M	2,225/112	25-75	FBG levels ≥7.0 mmol/L and/or 2-h plasma glucose (2-hPG) levels ≥11.1 mmol/L; impaired glucose tolerance was defined as FBG levels	BMI	Age, sex, body mass index, waist circumference, mean arterial pressure, hemoglobin A1c, total cholesterol, high-density lipoprotein cholesterol, fasting blood glucose, fasting insulin, alanine transaminase and triglyceride levels, family history of diabetes mellitus, education, household income, neutrophil/lymphocyte ratio, frequency of pork consumption.
Chen, [928] 2018 China	Rich Healthcare Group in China	3.1	W/M	211,833/4,174	20-80 (42.1)	FPG ≥7.00mmol/L and/or self-reported diabetes during the follow-up period	BMI	Age, sex, smoking status, drinking status, family history of diabetes.
Chung, [929] 2020 Japan	Japanese National Health Insurance System	3.9 (Kawauchi village) and	W/M	937/71	(68.4)	FBG ≥ 126 mg/dL or HbA1c ≥ 6.5% or hospital visit for DM or usage of diabetic medication	BMI	Age, sex, smoking status, drinking status, physical

		3.6 (Ono town)						activity, restful sleep, lifestyle change score.
Conway, [930] 2011 China	Shanghai Men's Health Study and the Shanghai Women's Health Study	5.9	W/M	124,373/2,754	40-74	FPG ≥7 mmol/L or ≥11.1 mmol/L on an OGTT, and/or reporting use of a hypoglycemic agent	WHR, WHtR, HC	Sex, education, income, occupational status, energy intake, physical activity, current smoker status, alcohol consumption, hypertension, family history of type 2 diabetes.
Cugati, [931] 2007 Australia	The Blue Mountains Eye Study	10		3,654/163	≥49	Self-reported diabetes history and current use of diabetic medications, or FPG ≥7.0 mmol/L	BMI	Age, sex, family history of diabetes, smoking, hypertension, fasting plasma glucose, hyper-cholesterolaemia, hyper-triglyceridemia, low serum HDL level
Dai, [932] 2019 China	China Kadoorie Biobank study	5	W/M	16,407/647	30-44	Physician diagnosis of diabetes or screen-detected diabetes 1) a fasting blood glucose level ≥7.0 mmol/L; (2) a random blood glucose level ≥11.1 mmol/L and a fasting time < 8 h; (3) a random blood glucose level ≥7.0 mmol/L and a fasting time > 8 h	BF%	Age, WHR
Dawson, [933] 2003 UK	Aberdeen Study of Cardiovascular Health in Women	20	W	1,257/60	28-48	Doctor's diagnosis of diabetes or a random glucose value greater than 11.0 mmol/l at follow-up examination or taking medication for diabetes	BMI	Age, sex, BMI at follow-up.
de Oliveira, [934] 2019 Brazil	The Baependi Heart Study cohort	5	W/M	1,121/75	18-102	FPG ≥126 mg/dL or antidiabetic drug use	BAI	Age, sex, physical activity, TG, HDL.
DeJesus, [935] 2016 US	Three primary care clinics	5	W/M	106,821/1845	20-85	FPG ≥126 mg/dL or an HbA1c ≥6.5	BMI	Age, sex, race/ ethnicity, baseline glucose.
Derakhshan, [936] 2014 Iran	TLGS	9	W/M	8,400/736	20-99	FPG ≥7 mmol/L, or 2-h postload glucose ≥11.1 mmol/L or taking anti-diabetic medication	HC	Age, sex, BMI, WC, fasting plasma glucose, WHtR, SBP, DBP, TG, HDL, TC, smoking, activity,

Ding, [937] 2020 China	the Jinchang Cohort Study	2.2	W/M	30,649/1,150	(45.5)	FPG ≥7.0 mmol/l or self-report clinical diagnosis of T2D, or self-report of use of anti-diabetes drugs	BMI, WC, WHtR	Age, sex, educational level, smoking and alcohol consumption history, occupational history, family history of type 2 diabetes, systolic blood pressure, TG/HDL
Dotevall, [938] 2003 Sweden	The Göteborg BEDA study	18	W	1,351/63	39-65	Examination plasma glucose with a standard hexokinase method	BMI	Age, sex, BMI, triglycerides, systolic blood pressure, physical activity.
Dunstan, [939] 2002 Australia	The Australian Diabetes, Obesity and Lifestyle study (AusDiab)	4.3	W/M	4327/130	(47.1)	ADA criteria	BMI	Age, sex, smoking, alcohol drinking, physical activity
Ebrahimi, [940] 2016 Iran	Shahroud eye cohort study	5	W/M	5,190/637	45-69	Non-FBG levels were ≥200 and/or they were taking blood glucose-lowering drugs	BMI	Age, sex, education, blood pressure, smoking, marital status, insurance, economic status
Fan, [941] 2020 China	Tianjin Medical University General Hospital Health Management Center	2.8	W/M	10,419/805	20-80 (46.2)	1) Self-reported doctor-diagnosed diabetes, 2) fasting plasma glucose ≥7.0 mmol/L, 3) 2-h plasma glucose ≥11.1 mmol/L, or 4) HbA1c ≥6.5%	BMI, WC, WHR	Age, sex, family history of diabetes, smoking, alcohol drinking, baseline waist circumference (in the analyses of BMI), and baseline BMI (in the analyses of waist circumference and waist-height ratio).
Feng, [942] 2018 Canada	National Child Development Study	12	W/M	15,043/341	>50	Self-reported diabetes	BMI	Sex, birth weight, cumulative obesity dose, myocardial infarction.
Feng, [943] 2021 China	Shanghai Men's and Women's Health Studies	9.2 (men) and 13.9 (women)	W/M	127,540/9,240	40-74	FBG≥7 mmol/L or blood glucose 2 hours after meal ≥11.1 mmol/L or use of insulin or hypoglycemic agents or had symptoms of diabetes	BMI, WC	Age, sex, occupation, family history of diabetes, income, educational level, energy intake, physical activity, BMI, smoking, alcohol drinking, hypertension and menopause status.

Feng, [944] 2020 China	Binhai Health Screening Program in Tianjin	4	W/M	49,702/1,043	63-71 (66)	FPG ≥126 mg/dL, or a 2-hour postload glucose level of ≥200 mg/dL or if the 2-hour postload value was missing; diabetes was also indicated if the physician diagnosed the participant with diabetes and/or the participant used diabetes medication	BMI	Age, sex, smoking, alcohol consumption, vegetable and meat consumption, and physical exercise, ALT, AST, BUN, serum creatinine, total cholesterol.
Fingeret, [945] 2018 Switzerland	CoLaus study	10.9	W/M	3,038/76	(49.9)	PFG ≥7.0 mmol/L and/or anti-diabetic drug treatment	BMI	Age, sex, smoking status, education, physical activity.
Ford, [946] 1997 US	the National Health and Nutrition Examination Survey Epidemiologic Follow-up Study	10	W/M	8,545/487	25-74	Death certificates, hospitalization and nursing home records, and self-report	BMI	Age
Fujita, [947] 2008 Japan	the Chiba and Kashiwa Cohorts	5 (Chiba) and 12 (Kashiwa)	W/M	64,523/4,570	40-79	FBG ≥126 mg/dl and/or HbA1c ≥6.5%	BMI	Age, sex, smoking habit, family history of diabetes mellitus, alcohol consumption and baseline glucose, HbA1c.
Fukuda, [948] 2016 Japan	NAGALA	12.8	W/M	4,629/351	(41.5)	HbA1c ≥ 6.5% or FPG ≥126 mg/dl	BMI	Age, sex, parental history of diabetes, lifestyle parameters, former smoker, HbA1c.
Gil-Montalbán, [949] 2015 Spain	PREDIMERC cohort	6.4	W.M	2,048/44	30-74 (46.9)	WHO criteria	BMI, WC	Age, sex, social class, fasting plasma glucose, HbA1c, family history of diabetes, hypertension, hyper-cholesterolemia, hyper-triglyceridemia, smoking, activity
Diabetes Prevention Program, [950] 2006 US	Diabetes Prevention Program (DPP)	3.2	W/M	3,234/500	(53.8)	Physician-diagnosed diabetes	BMI, WC, HC, WHR, WHtR	Age, sex, self-reported race/ethnicity.
Hackett, [951] 2020 UK	English Longitudinal Study of Ageing	10	W/M	4,112/264	(65.02)	Self-reported diabetes	BMI	Age, sex, wealth, ethnicity, smoking, physical activity,

								alcohol consumption, BMI, hypertension, CVD, HbA1c.
Hadaegh, [952] 2009 Iran	TLGS	3.5	W	2,801/114	(45.2)	Current use of hypoglycemic agent or FPG ≥126 mg/dL and/or 2-hour postload glucose ≥200 mg/dL	BMI, WC, WHR, WHtR	Age, sex, hypertension, family history of diabetes and triglycerides, abnormal glucose tolerance.
Hadaegh, [953] 2006 Iran	TLGS	3.6	M	1,852/69	(45.1)	FBS ≥ 126 mg/dl and/or 2-hour postload glucose ≥ 200 mg/dl	BMI, WC, WHR, WHtR	Age, sex, hypertension, family history of diabetes and triglycerides, abnormal glucose tolerance.
Haffner, [954] 1991 US	The San Antonio Heart Study	8	W/M	620/43	25-64	FPG≥7.8 mmol/L or blood glucose 2 hours after meal ≥11.1 mmol/L	BMI	Sex, BMI.
Han, [955] 2017 China	The Rural Chinese Cohort Study	6.01	W/M	11,687/749	18-74	Currently using antidiabetic agents, or FPG level ≥7.0 mmol/l	BMI, WC, WHR, ABSI, BAI	Age, sex, smoking, alcohol consumption, physical activity, systolic and diastolic blood pressure and total cholesterol, triglycerides, HDL-cholesterol.
Hardy, [956] 2016 US	Atherosclerosis Risk In Communities (ARIC) study	11.85	W/M	12,121/1,359	45-64 (54)	FBG ≥126mg/dL, non-FBG ≥200 mg/dL, self-reported diabetes diagnosis, or taking diabetes medications	BAI, ABSI, WHR, WHtR	Age, sex, ethnicity /race.
Hart, [957] 2006 UK	Renfrew/Paisley and the Collaborative occupational study	29 (Renfrew/ Paisley)and 32 (Collaborative occupational)	W/M	19,147/967	45-64	Acute hospital discharge data and from death certificates	BMI	Age, sex, social class, smoking, systolic blood pressure, cholesterol.
Hartwig [958] 2015, German	Four German Cohorts	12.1	W/M	10,258/595	50.5-62.2 (55.5)	Physician-diagnosed diabetes or self-reported current intake of antidiabetic medication	BMI, WC, WHR, WHtR	Sex, study region, education, alcohol consumption, smoking, sports activities, nutritional score.
He, [959] 2013 China	Chengdu, Sichuan province, China	15	W/M	711/74	(48.1)	self-reported history or FPG ≥7.0 mmol/L	ABSI, BMI, WC	Age, sex, total cholesterol, LDL-C, HDL-C, triglycerides, fasting plasma glucose, prevalence of hypertension

Heianza, [960] 2012 Japan	The Toranomon Hospital Health Management Center Study	4	M	5,346/214	(48.6)	FPG ≥126 mg/dL, self-reported clinician-diagnosed diabetes, or HbA1c ≥6.5%	BMI	Age, sex, parental history of diabetes, physical activity, smoking status, BMI, hypertension, log-transformed triglycerides, HDL-cholesterol.
Hinnouho, [961] 2015 UK	Whitehall II cohort study	17.4	W/M	7,122/798	39-63	a 2-h OGTT ≥200 mg/dL (≥11.1 mmol/L) or, if the 2-h post-load value was missing, FPG 126 mg/dL (≥7.0 mmol/L) or physician diagnosed diabetes and/or use of diabetes medication	BMI	Sex, socioeconomic status, marital status, ethnicity physical activity, smoking, alcohol, fruits and vegetables consumption, CVD medication.
Hjerkind, [962] 2016 Norway	HUNT study	11	W/M	38,231/957	20-85 (45.2)	Blood glucose after 2 hours was ≥11.0 mmol/L	BMI	Age, sex, education, alcohol frequency in the past 2 weeks, smoking, BP medication use, prevalent CVD, BMI, physical activity.
Holtermann, [963] 2006 Denmark	The Copenhagen Male Study	44	M	4,988/518	(48.7)	ICD-8: 249–250; ICD-10: E10-E11; E13-E14	BMI	Age, sex, smoking status, grams of tobacco per day, systolic and diastolic blood pressure, self-reported physical activity, alcohol consumption, social class, BMI, cardiorespiratory fitness.
Hu, [964] 2006 Finland	North Karelia and Kuopio Study	13.4	W/M	21,385/964	35-74	FPG ≥7.8 mmol/l (≥7.0 mmol/l) or OGTT ≥11.1 mmol/l or treatment with a hypoglycemic drug (oral antidiabetic agents or insulin)	BMI	Age, sex, study year, education, SBP, bread consumption, frequency of vegetable consumption, frequency of fruit consumption, frequency of sausage consumption, coffee consumption, tea consumption, alcohol consumption, smoking, physical activity, BMI.
Hu, [965] 2017 Japan	J-ECOH	7	W/M	51,777/3,465	30-59 (45.3)	HbA1c ≥ 6.5%, FPG ≥ 126 mg/dl, random plasma glucose ≥ 200 mg/dl, or currently under medical treatment for diabetes	BMI	Age, sex, worksite, baseline age, hypertension, dyslipidemia, smoking, fasting plasma glucose, HbA1c.

Huerta, [966] 2013 Spain	Spanish EPIC	12.1	W/M	37,733/2,513	30-65	2-hour post-load glycaemia value ≥ 200 mg/dl after a 75-g OGTT, HbA1c > 7%, FPG ≥126 mg/dl, non-fasting glycaemia ≥ 200 mg/dl, diabetes related medical visit	BMI, WC, HC, HWR, WHtR	Age, sex, smoking status, alcohol intake, family history, and baseline value of fasting blood glucose.
Hwang, [967] 2015 US	Japanese American Community Diabetes Study	10	W/M	406/91	34-75 (51.6)	FPG ≥7.0 mmol/L or treatment involving oral hypoglycemic agents or insulin therapy or 2-h post glucose load ≥11.1 mmol/L	BMI, WC	Age, sex, family history of diabetes, alcohol drinking, physical activity, Lipid-lowering medication, blood pressure, fasting plasma glucose, TC, TG, LDL, HDL
Ishikawa-Takata, [968] 2002 Japan	Male employees of a company	4	M	4,747/662	18-59 (37.6)	FBG ≥126 mg/dl or by taking medication for diabetes	BMI	Age (1 y categories), smoking status (never, past, current), alcohol intake (never, less than three times per week, more than three times per week), family history, and baseline value of systolic blood pressure
Jackson, [969] 2015 US	The MOVE! programme	8	W/M	238,540/90,096	(53.6)	ICD-9 or prescription of a diabetes drug	BMI	Age, marital status, additional comorbidities, Charlson comorbidity index, sleep apnoea, chronic obstructive pulmonary disease, and drug abuse.
Jacobsen, [970] 2002 Norway	The Tromsø study	7	W/M	10,055/73	20-54 (37.5)	Validated self-reported diabetes	BMI	Age, sex, non-fasting glucose, Non-fasting serum triglycerides, serum HDL cholesterol, systolic blood pressure, treatment for hypertension, physical activity.
Jacobs-van der Bruggen, [971] 2010 Netherlands	The Doetinchem Cohort Study	5	W/M	4,259/124	20-59	Self-reported diabetes	BMI	Age, sex.
Jae, [972] 2016 Korea	The Samsung Medical Center, Seoul	5	M	3,770/170	20-76 (47)	HbA1c ≥6.5% and/or FPG ≥126 mg/dl or physician diagnosis	BMI	Age, sex, fasting glucose, systolic blood pressure, total cholesterol, HDL cholesterol, LDL cholesterol, TG, uric acid,

								resting heart rate, cigarette smoking, alcohol consumption, peak oxygen uptake.
Jafari-Koshki, [973] 2016 Iran	Isfahan Endocrine and Metabolism Research Center	8	W/M	1319/102	21-73 (43.12)	Baseline and follow-up OGTTs according to American Diabetes Association criteria or FPG ≥200 mg/dl (11.1 mmol/l) or pharmacological treatment	WC, HC, WHR	Age, WC, HC, and WHR
Janghorbani, [974] 2010 Iran	The Isfahan diabetes prevention study	2.3	W/M	704/72	20-70 (42.7)	FPG ≥200 mg/dl (11.1 mmol/l) or pharmacological treatment	BMI, WC, WHR, WHtR	Age, sex.
Janghorbani, [975] 2012 Iran	The Isfahan diabetes prevention study	5.5	W/M	1,092/102	(42.8)	FPG ≥200 mg/dl (11.1 mmol/l) or pharmacological treatment	HC	Age, sex.
Janghorbani, [976] 2016 Iran	The Isfahan diabetes prevention study	7	W/M	1,720/256	30-70 (43)	FPG ≥11.1 mmol/L or pharmacologic treatment	VAI	Age, sex.
Jia, [977] 2011 China	the Kailuan Company in Tangshan city	2	W/M	61,703/2,991	18-85 (50.4)	FPG ≥7.0 mmol/L on two occasions or current use of insulin or oral hypoglycemic agents or a positive response to the question, ''Has a doctor ever told you that you have diabetes?''	WHtR	Age, smoking, alcohol intake, regular physical exercise, family history of diabetes, SBP, lgHDL, lgTG and lgBS
Jung, [978] 2016 Korea	Promotion Center of the Asan Medical Center	3	W/M	34,258/580	20-88 (47.4)	FPG ≥7.0 mmol/L or HbA1c ≥6.5% (48 mmol/mol)	BMI	Age, sex, baseline drinking, smoking, exercise habits, family history of diabetes, HbA1c, total cholesterol, LDL-C, uric acid, AST, and ALT
Jung, [979] 2017 Korea	The National Health Insurance database of Korean individuals	10	W/M	850,282/73,756	40-79 (50)	≥90 total prescription days of insulin and oral hypoglycemic agents or fasting glucose levels ≥126 mg/dL at least twice during biennial blood tests	BMI	Age, family history of diabetes, income level, physical exercise, and alcohol consumption
Jung, [980] 2014 Korea	Comprehensive health examinations at Kangbuk Samsung Hospital Total Healthcare Centers	5.1	W/M	34,999/889	30-59 (37)	FPG ≥126 mg/dl, a glycated hemoglobin ≥6.5%, or the use of blood glucose lowering agents	BMI	Age, sex, smoking status, alcohol intake, and regular exercise.

Kametani, [981] 2002 Japan	Health Examination Center of Kouseiren Takaoka Hospital	9	W/M	7,222/114	18-85	FPG ≥126 mg/dl	BMI	Age, obesity, hypertension, hypertriglyceridemia
Kanaya, [982] 2006 US	Health, Aging, and Body Composition Study	5	W/M	2,356/143	70-79	FPG ≥126 mg/dl	BMI, VAI	Age, sex, race, abdominal obesity, adiponectin, leptin, fasting glucose, insulin, HDL cholesterol, TG, hypertension.
Kaneto, [983] 2013 Japan	MY Health Up Study	5	W/M	13,700/408	(47.5)	FPG ≥126 mg/dl	BMI	BMI at age 20 years, sex, job type, family history of diabetes, hypertension, exercise, hours of sleep.
Kang, [984] 2020 China	National Free Physical Examination Program in the Chadian of Hangu area, Tianjin, China	3	W/M	1,057/39	60-86 (67.4)	FPG ≥126 mg/dL or the use of insulin or oral hypoglycemic agents, reexamination of FPG, OGTT or glycated hemoglobin level	BMI	Age, sex, widowed, hypertension, hyperlipidemia, gout, educational level, smoking and drinking habits, fasting blood glucose, physical activity, depression.
Katzmarzyk, [985] 2007 Canada	The physical activity longitudinal study	15.5	W/M	1,543/78	(37.2)	Self-reported diagnosis of diabetes	BMI, WC, WHR	Age, sex, smoking status, alcohol consumption and parental history of diabetes.
Kim, [986] 2019 Korea	The Health Screening and Promotion Center of the Asan Medical Center	5.5	W/M	17,280/771	20-49 (48.1)	FPG ≥7.0 mmol/L or HbA1c ≥6.5% (48 mmol/mol) or if anti-diabetic medications	WC, FMI	Age, sex, HbA1c, HOMA-IR, HOMA-beta, physical activity, smoking, alcohol drinking, family history of diabetes, systolic blood pressure, serum cholesterol, triglycerides, HDL-cholesterol.
Kittithaworn, [987] 2019 Thailand	Sanam Chai Khet, Chachoengsao Province, central Thailand	7	W/M	1,358/122	30-50 (49.4)	FPG ≥7 mmol/L (126 mg/dL) or when the individuals had a known clinical diagnosis of the disease	WC	Age, sex, blood pressure, waist circumference, impaired fasting plasma blood glucose.
Klein, [988] 2002 US	Beaver Dam, Wisconsin	5	W/M	4,423/114	43-84	Treated with insulin and/or oral hypoglycemic agents and/or diet) or hyperglycemia	BMI	Age, sex.
Koloverou, [989] 2019 Greece	ATTICA study	10	W/M	3,042/133	18-89 (45.5)	FPG ≥126 mg/dL or use of antidiabetic medication	VAI	Age, sex, years of school, physical activity and adherence to the Mediterranean diet,

								smoking, hypertension and hyper-cholesterolemia, family history of diabetes
Kotronen, [990] 2013 Finland	Mini-Finland Health Survey	15	W/M	4,517/217	40-79	Medical certificate from an attending physician describing the diagnostic criteria	BMI	Age, sex, education, activity, alcohol drinking, smoking status, blood pressure, TG, HDL, fasting plasma glucose,
Kulick, [991] 2015 US	The Northern Manhattan Study	11	W/M	2,430/449	(69)	Self-reported diabetes	BMI	Age, sex, education, race, alcohol drinking, smoking, physical activity, hypertension, HDL, C-reactive protein
Kuwabara, [992] 2017 Japan	Japanese Cohort Study	5	W/M	9,721/765	30-85 (48.5)	DM on medication and/or HbA1c ≥6.5%	BMI	Age, sex, smoking and drinking habits, chronic kidney disease, body mass index and metabolic syndrome category (lean/normal and overweight/obesity with and without metabolic syndrome), and hyperuricemia (or serum uric acid).
Lamichhane, [993] 2020 US	ARIC	9	W/M	12,672/1,501	45-64 (53.6)	(1) FPG ≥126 mg/dL, (2) nonfasting glucose ≥200 mg/dL, (3) self-reported physician diagnosis of diabetes, or (4) use of antidiabetes medications, including oral agents and insulin	BMI	Education, smoking status, alcohol consumption, and height at examination 1, smoking status at age 25 years, and age and physical activity measured from visit 1 through visit 4.
Lee, [994] 2009 US	Cooper Clinic in Dallas, Texas	32	M	14,006/477	20-79	FPG ≥7.0 mmol/l	BMI, WC, BF%	Age, examination year, parental diabetes, current smoking, alcohol consumption, systolic and diastolic blood pressure, total cholesterol, fasting plasma glucose
Lee, [995] 2016 Korea	the Health Promotion Center of Kangbuk Samsung Hospital, Sungkyunkwan	4	W/M	2,900/101	(44.3)	FPG ≥126 mg/dL or HbA1c ≥6.5% and/or the current use of anti-hyperglycemic medications	BMI	Age, sex, smoking, alcohol drinking, activity

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Lee, [996] 2020 Korea	South Korean National Health Insurance Service	5.13	W/M	19,475,643/ 1,906,963	(50.26)	(ICD)-10 codes E11, E12, E13, or E14, the prescription of antidiabetes medication, and/or FPG level ≥126 mg/dL	WC	Age, race, family history of diabetes, alcohol consumption, calorie intake, smoking, physical activity, dietary factors in quintiles (trans fat, polyunsaturated fat to saturated fat ratio, cereal fiber, whole grain, and glycemic load). For women, additionally adjusted for menopausal status (pre or post) and post-menopausal hormone use
Ley, [997] 2009 Canada	The Sandy Lake Health and Diabetes Project	10	W/M	540/86	10-59 (28.45)	FPG ≥7.0 mmol/L, or a 2-hour postload plasma glucose ≥11.1 mmol/L on an OGTT; current use of insulin or oral hypoglycemic agents; or a positive response to the question Have you ever been diagnosed with diabetes by a nurse (practitioner) or a doctor?	BMI, WC, WHtR, BF%	Age, sex
Li, [998] 2015 China	Nanjing Provincial Units	4	W/M	4,837/380	(52.70)	WHO diagnostic criteria	BMI	Age, sex, blood pressure, lipids, alanine aminotransferase, uric acid, and creatinine.
Li, [999] 2012 Japan	Aichi Prefecture	6	W/M	3008/164	35-66 (47.3)	FPG ≥126 mg/dL or self-reported diabetes	BMI	Age, sex, smoking status, physical activity, alcohol drinking, ln-CRP, glucose and ln-insulin
Lissner, [1000] 2001 Sweden	Gothenburg Women's Health Study	24	W	1405/77	38-60 (46.8)	Searches in the national mortality and local hospital registries	HC	Age, smoking status, BMI, and waist circumference at baseline.
Liu, [1001] 2013 China	Chinese Multi-provincial Cohort Study	15	W/M	687/74	35-64	FPG ≥7.0 mmol/L, or a positive response to the question, "Has a doctor ever told you that you have diabetes?", or current use of insulin or oral hypoglycemic agents	BMI, WC, WHR, WHtR	Age, smoking status, BMI, and waist circumference at baseline.

Liu, [1002] 2020 US	The Beijing Health Management Cohort	7	W/M	43,404/2,623	18-80 (36.79)	Self-reported history of a diabetes diagnosis, the use of antidiabetic medicine, or a measured FPG ≥7.0 mmol/L	BMI, WHR	Age, education, family history of diabetes, sleep duration, fasting plasma glucose,
Liu, [1003] 2020 China	Rich Healthcare Group in China	2.98	W/M	82,938/5,905	(44.99)	FPG ≥7.0 mmol/L or a self-reported presence of DM	BMI	Age (count), FPG, TC, TG, and family history of diabetes
Liu, [1004] 2016 China	The BLSA study	20	W/M	1,857/144	55-96	Self-reported history of diabetes diagnosis, taking antidiabetic medicine, or FPG ≥7.0mmol/L	BMI	Age, sex, physical activity, smoking, fasting plasma glucose, alcohol drinking, depression, blood pressure, blood lipids, diet
Liu, [1005] 2020 China	The Tianjin Brain Study	23	W/M	971/105	30-59 (46.12)	FPG levels ≥7.0 mmol/L, a previous diabetes diagnosis, or using insulin or oral antidiabetic drugs	BMI	Age, sex, education, smoking status, hypertension
Lorenzo, [1006] 2009 US	The San Antonio Heart Study	7.4	W/M	2,511/1734	25-64 (43.2)	FPG ≥7.0 mmol/L, 2-hour glucose ≥11.1 mmol/L	BMI, WC, WHR, WHtR	Age and ethnicity
Luo, [1007] 2015 China	The Prevention of MS and Multi-metabolic Disorders in Jiangsu Province of China Study (PMMJS)	4	W/M	3,598/160	35-74	Medical history	BMI, WC	Age, sex, alcohol consumption, and family history of diabetes
Luo, [1008] 2015 China	Shanghai communities—Shanghai Diabetes Study	3.7	W/M	2,764/100	30-90 (60.3)	FPG ≥7 mmol/L and/or 2 h plasma glucose Endocrine 123≥7.8 mmol/L and/or diabetes mellitus having been diagnosed and currently receiving therapy	BF%	Age, total cholesterol (TC), triglyceride (TG) and family history of diabetes
Luo, [1009] 2018 US	Women's Health Initiative	14.6	W	136,112/18,706	50-79	Self-report by a positive report of a new diagnosis of diabetes treated with insulin or oral drugs during follow-up	BMI, WC, WHR, BF%	Age, race/ethnicity, education, family history of diabetes, different study cohorts, smoking, alcohol intake, physical activity, HEI-2005 score, high cholesterol requiring medicine
Lv, [1010] 2017 China	China Kadoorie Biobank	7.2	W/M	461,211/8,784	30-79	E11 and E14 codes	BMI, WHR	Age, sex, education, marital status and family history of diabetes. Lifestyle factors

								including smoking, alcohol consumption, physical activity and intakes of vegetables and fruits, red meat and wheat were included simultaneously in the same model
Lyssenko, [1011] 2011 Denmark	the Inter99 and Botnia studies	15	W/M	6,552/215	40-55 (48.1)	FPG ≥ 7.0 mmol/L or 2-h glucose ≥ 11.1 mmol/L during an OGTT	BMI, WC	Age, sex, blood pressure,
Ma, [1012] 2020 China	Harbin People's Health Study (HPHS) and Nutrition and Chronic Non-communicable Diseases (HDNNCDS)	6	W/M	8,735/825	20-74	FPG ≥126mg/dL or 2hPG ≥200mg/dL or HbA1c ≥6.5%, or taking medication	BMI	Age, systolic blood pressure, alcohol use, smoking history, education, regular exercise, family history of diabetes and prediabetes status at baseline, and follow-up years, in each strata
Magliano, [1013] 2008 Australia	The Australian Diabetes, Obesity and Lifestyle Study	5	W/M	5,842/224	25-88 (50.9)	FPG ≥7.0 mmol/l or 2-hour post glucose load ≥11.1 mmol/l or current treatment with insulin or oral hypoglycemic agents	WC	Age, sex, smoke, education, activity, hypertension, family history of diabetes
Marott, [1014] 2016 Denmark	Copenhagen General Population Study	6	W/M	95,756/1,823	20-100	WHO and ICD	WC	Age, gender, physical activity, pack years in smokers, alcohol consumption, education, income, waist circumference, triglyceride level, HDL-C level, systolic and diastolic BP, and glucose level.
McDermott, [1015] 2010 Australia	Indigenous communities in Far North Queensland	6	W/M	1,814/554	25-54	Medical records, or a 2- hour OGTT result (blood glucose level >11.1 mmol/L 2-hour post glucose load), or fasting blood glucose level (>7 mmol/L)	BMI, WC, WHR	Age, sex, ethnicity, smoking, alcohol-drinking and physical activity
Mehlig, [1016] 2014 Sweden	The Prospective Population Study of Women in Gothenburg	34	W	1,448/139	38-60	Physician, if she was on antidiabetic medication or if two FPG ≥7.0 mmol/l	BMI	Age, education, smoking, consumption of alcohol, triglycerides, hypertension,

								obesity, inactivity, and obesity × inactivity, at start of observation
Meigs, [1017] 2006 US	Framingham Offspring Study	7	W/M	2902/141	(53)	FPG ≥7.0 mmol/l or 2-hour post glucose load ≥11.1 mmol/l or oral hypo-glycemic agents	BMI	Age, sex, LDL-C, and smoking
Meisinger, [1018] 2006 Denmark	The Monitoring Trends and Determinants on Cardiovascular Diseases (MONICA)/ Cooperative Health Research in the Region of Augsburg (KORA) Augsburg Cohort Study	9.2	W/M	6,012/243	35-74	Self-reported clinically diagnosed type 2 diabetes	BMI, WC, WHR	Age, sex, survey, education, parental history of diabetes, hypertension, dyslipidemia, smoking, alcohol intake, and physical activity
Miller, [1019] 1996 Trinidad	the St James survey	5.47	W/M	2,491/153	35-69	FPG ≥7.8 mmol/l or 2-hour glucose ≥7.0 mmol/l or current antidiabetic therapy	BMI	Age, ethnic group, SBP, DBP
Mitsuhashi, [1020] 2017 Japan	Oike Clinick	5	W/M	2,263/286	(59.1)	FPG ≥7.0 mmol/l or self-reported clinician-diagnosed diabetes or HbA1c ≥6.5%	BMI	Age, sex, alcohol drinking, physical activity, smoking status, family history of diabetes
Monterrosa, [1021] 1995 US	San Antonio Heart Study	8	W/M	844/57	25-64	FPG ≥140 mg/dl or 2-h post-glucose load plasma glucose >200 mg/dl	BMI	Age, SES, and structural assimilation
Mukai, [1022] 2009 Japan	The Hisayama study	11.8	W/M	1,935/286	40-79 (56.5)	FPG ≥7.0 mmol/l and/or 2-h postload glucose concentrations of ≥11.1 mmol/l and/or the use of antidiabetes medication	WC	Age, family history of diabetes, total cholesterol, alcohol intake, smoking habits, and regular exercise.
Mustafina, [1023] 2021 Eastern Europe	The HAPIEE project	14	W/M	7,739/915	45-69	FPG ≥7.0 mmol/L or current treatment with insulin or oral hypo-glycaemic agents	BMI, WC	Age, sex, a family history of diabetes mellitus, fasting hyperglycaemia, a history of cardiovascular disease, hypertension, abdominal obesity, high TG level, low HDL-C concentration, education level,

								smoking, low PA, and fruit and vegetable consumption
Nagaya, [1024] 2004 Japan	Gifu Prefectural Centre for Health Check and Health Promotion	7.4 (M) 7.1 (W)	W/M	25,199/1,093	30-59	FPG ≥7.00 mmol/l (126 mg/dl) and/or under medical treatment for diabetes mellitus by questionnaire	BMI	Age, smoking, drinking, exercise and education
Nakanishi, [1025] 2003 Japan	Employees of Company A, one of the largest building contractors in Japan	7	M	6,182/436	35-59	FPG ≥7.0 mmol/l or receipt of hypoglycemic medications	BMI	Age, family history of diabetes, alcohol consumption, cigarette smoking, and all other components of the metabolic syndrome at study entry
Namayandeh, [1026] 2019 Iran	Yazd Healthy Heart Cohort	10	W/M	1,641/98	20-74	Taking antidiabetic drugs and having fasting blood glucose levels ≥126 mg/d	BMI	Age, family history of diabetes, TG, serum uric acid
Narayan, [1027] 2020 India, Pakistan and US	Cardiometabolic Risk Reduction in South Asia Study (CARRS) and Pima Indians of Arizona	4.8 and 6.7	W/M	4,988/971	20-44	FPG ≥7.00mmol/L (126mg/dL), HbA1c≥6.5% (48 mmol/mol), or self-reported/physician diagnosed diabetes or glucose lowering medication use	BMI	Age, sex
Narisada, [1028] 2021 Japan	The Aichi Health Promotion Study	4.8 (M) 4.7 (W)	W/M	19,633/876	30-64 (47.8)	HbA1c ≥6.5%, random plasma glucose ≥200 mg/dL, FPG ≥126 mg/dL or self-reported receipt of antidiabetic treatment	BMI	Age, smoking status, alcohol consumption, physical activity, family history of diabetes, hypertension and dyslipidemia
Navarro-Gonzále, [1029] 2016 Spain	The Vascular-Metabolic CUN cohort	9	W/M	4,340/262	18-90	Symptoms of diabetes plus random plasma glucose concentration ≥200 mg/dL, or FPG ≥126 mg/dL, or 2-h postload glucose ≥200 mg/dL during an OGTT	BMI	Age, sex, cigarette smoking (never, current, and former smokers), daily alcohol intake (yes/no), lifestyle pattern (physically active/sedentary behavior), cardiovascular disease, anti-aggregation therapy, LDL-cholesterol, hypertension, HDL-cholesterol, and triglycerides

Nemesure, [1030] 2008 US	The Barbados Eye Studies	9	W/M	4,631/444	40-84 (59)	Self-reported history of physician-diagnosed diabetes and/or a HbA_{1c} level >10%	BMI, WHR	Age, sex, and another anthropometric measure
Nichols, [1031] 2008 US	Kaiser Permanente Northwest	6.7	W/M	46,578/1,854	(57.5)	ICD, 9th Revision-Clinical Modification diagnosis 250.xx or FPG >125 mg/dL	BMI	Age, sex, fasting plasma glucose, SBP, TG, HDL, LDL, smoking, hypertension, and cardiovascular disease
Njølstad, [1032] 1998 Norway	The Finnmark Study	12	W/M	11,654/162	35-52	WHO criteria	BMI	Age, diastole blood pressure, high density lipoprotein cholesterol, glucose, smoking, height, antihypertensive treatment, physical activity, and ethnicity
Novak, [1033] 2012 Sweden	The Multifactor Primary Prevention Trial Study	35	M	7,251/899	47-56	ICD codes	BMI	Age, sex
Nyamdorj, [1034] 2008 Mauritius	Mauritius is an island in the Indian Ocean	5	W/M	3,945/628	25-74	FPG ≥7.0 mmol/l or 2 h 75 g postchallenge plasma glucose of ≥11.1 mmol/l or self-report of drug treatment for type 2 diabetes	BMI, WC, WHR, WHtR	Fasting glucose, cohort, triglyceride, family history of diabetes, blood pressure, and socioeconomic status
Oh, [1035] 2021 Korea	Korean Genome and Epidemiology Study	10	W/M	8,740/910	40-69	FPG levels ≥126 mg/dL or 2-h postprandial levels ≥200 mg/dL or HbA1c levels ≥6.5%	WC	Age, sex, region, smoking, blood pressure, family history of diabetes
Okada, [1036] 2021 Japan	Panasonic cohort study	3	W/M	19,412/416	(42.16)	FPG ≥126mg/dL, having a self-reported history of diabetes and/or the use of antidiabetic medication	BMI	Age, sex, blood pressure, HDL, LDL, TG, fasting plasma glucose, smoking, physical activity, alcohol drinking
Okamura, [1037] 2019 Japan	Murakami Memorial Hospital	5.1	W/M	15,464/373	(43.7)	HbA1c ≥6.5%, FPG≥7 mmol/L or self-reported	WC	Age, grade of alcohol consumption, smoking status, exercise and fasting plasma glucose
Onat, [1038] 2010 Turkey	The Turkish Adult Risk Factor Study	7.4	W/M	2,111/222	(49)	FPG ≥7 mmol/L (or 2-h postprandial glucose N11.1 mmol/L) and/or the current use of diabetes medication	BMI	Age, sex, and lipid lowering drugs-adjustments
Ould Setti [1039] 2019 Finland	Kuopio Ischaemic Heart Disease Risk Factor Study (KIHD)	4.2	M	1087/55	(51.7)	Validated self-reported diabetes	BMI	Age, smoking, physical activity, alcohol drinking

Pajunen, [1040] 2013 Finland	Health 2000 study	8.1	W/M	5,168/222	(50)	ICD-10 codes E10 to E14 in at least one of three registers	BMI, WC, WHR	Age, sex, education, smoking, alcohol consumption, physical exercise
Park, [1041] 2018 Korea	The Korean National Health Insurance Cohort	5.61	W/M	465,629/23,808	>20	FPG ≥126 mg/dl or disease codes	ABSI	Age and sex
Parker, [1042] 2008 US	ARIC	8.8	W/M	10,767/1,172	45-64	Had a FPG ≥126 mg/dL or had a nonfasting glucose level of ≥200 mg/dL, or reported having been told by a physician that they had diabetes, or reported taking medications for diabetes	WC, HC	Age, race, sex, clinical center, level of education, current smoking status at baseline and pack-years of cigarette smoking , alcohol consumption, family history of diabetes, baseline menopausal status and baseline hormone use by women, Keys' score, cereal fiber, fruit and vegetable intake, and physical activity
Poljičanin, [1043] 2012 Croatia	Croatian adult population	5	W/M	2,909/163	20-79 (55)	Self-reported diabetes	BMI, WC, HC	Age, sex, financial status, physical activity, healthy diet
Rathmann, [1044] 2009 Germany	KORA S4⁄F4 cohort study	7	W/M	1,353/93	55-74	Self-reported physician diagnosis, or newly diagnosed diabetes ≥7.0 mmol⁄L fasting or ≥11.1 mmol ⁄ l 2-h glucose	BMI	Age, sex
Regmi, [1045] 2020 UAE	Tawam Hospital	8.7	W/M	362/47	18-75 (53)	HbA1c levels ≥6.5% or physician diagnosed	BMI	Age, sex, history of hypertension, dyslipidemia, smoking status, vascular disease, HdA_{1c}
Ronaldsson, [1045] 2001 Sweden	Community of Lycksele in the county of VaÈsterbotten	8	W/M	2,278/42	30-60	FPG ≥7.8 mmol/L or 2-h p-glucose ≥12.2 mmol/L	BMI	Age, sex, fasting plasma glucose
Ryu, [1047] 2004 Korea	University of Seol	2.4	W/M	24,212/11,183	30-80 (41.7)	FPG ≥7.00 mmol/l (126 mg/dl)	WC	Age, baseline blood glucose,
Sakurai, [1048] 2009 Japan	Toyama Prefecture	8	W/M	3992/218	35-55	FPG concentration ≥ 7.0 mmol⁄ l; or 2-h glucose level	BMI	Age, sex, family history of diabetes, smoking, alcohol drinking and habitual exercise,

						≥ 11.1 mmol ⁄ l in a 75-g OGTT; or treatment with insulin or oral glucose-lowering agents.		hypertension, hyperlipidemia, fasting plasma glucose level.
Salminen, [1049] 2015 Finland	The municipality of Lieto in south-western Finland	9	M	430/30	40-70	ICD-10 codes E10–14	BMI	Age, smoking status, physical activity, blood glucose, cardiovascular disease
Sanada, [1050] 2012 Japan	Fukushima Prefecture, Japan	10	W/M	1,554/135	23-80 (50.5)	FPG ≥126 mg/dL, 2-h glucose level in a 75 g-OGTT ≥200 mg/dL and/or received medical treatment	BMI	Age, sex, SBP, DPB, TC, HDLC, TG, UA, FPG, 2h-PG and HOMA-IR
Sans, [1051] 2013 Spain	The ADIPOCAT study	10	M	1,1011/85	35-69	≥7.0 mmol/L or diagnosed diabetes	BMI	Age, DBP, HDL-cholesterol, log-triglycerides,
Sares-Jäske, [1052] 2020 Finland	The cohort sample used was based on the Health 2000 Survey (BRIF8901)	15	W/M	4,270/417	30-69	Physician diagnosed	BMI	Sex, age, education, BMI, physical activity, alcohol consumption, smoking, energy intake, AHEI, sleep duration, waist circumference, elevated blood pressure, serum HDL cholesterol, serum triglycerides and fasting serum glucose.
Sargeant, [1053] 2002 Jamaica	Spanish Town	4	W/M	728/51	25-74	FPG ≥7 mM and/or 2-hour postchallenge glucose ≥11.1 mM	BMI, WC, WHR, WHtR	Age, sex, smoking status, alcohol drinking, hypertension, family history of diabetes, income,
Sasai, [1054] 2010 Japan	The Ibaraki Prefectural Health Study	5.5	W/M	61,415/4,429	40-79	FPG ≥126 mg/dL, 2-h glucose level in a 75 g-OGTT ≥200 mg/dL and/or received medical treatment	BMI	Age, blood glucose, fasting status, systolic blood pressure, antihypertensive medication use, total cholesterol, high-density lipoprotein cholesterol, log-transformed triglycerides, lipid medication use, smoking status, alcohol intake (none, occasionally, and BMI change from baseline to the end of the year follow-up

Sattar, [1055] 2003 Scotland	West of Scotland Coronary Prevention Study	4.9	M	5,974/645	(55.15)	FPG ≥126 mg/dL and at least 1 post randomization fasting glucose measurement >36 mg/dL above baseline glucose or commencement of hypoglycemic drugs	BMI	Age, blood lipids, blood pressure, smoking
Sawada, [1056] 2010 Japan	Tokyo Gas Company	7	M	4,187/274	22-40 (32)	FPG ≥7.0 mmol ⁄ l or 2-h glucose level ≥11.1 mmol ⁄ l in a 75-g OGTT or treatment with insulin or oral glucose-lowering agents	BMI	Age, blood pressure, smoking status, alcohol drinking, and family history of diabetes
Schmidt, [1057] 2013 Denmark	The Danish National Health Service	33	M	6,502/316	18-55	ICD and ATC codes	BMI	Cognitive test score and years of education
Schulze, [1058] 2012 Germany	(EPIC)-Potsdam	7	W/M	25,167/849	25-74 (50)	Medical record or self-reported validated by physician or taking glucose-lowering drug	BMI, WC, HC, BAI	Age, survey (KORA only), education, smoking, alcohol consumption and physical activity
Seclen, [1059] 2017 Peru	PERUDIAB	3.8	W/M	662/49	25-85	FPG ≥126mg/dL or receiving medical diabetes treatment (oral anti-diabetes drugs and/or insulin)	BMI	Age, sex, education, family history of diabetes, physical activity, smoking status, alcohol drinking, hypertension
Shani, [1060] 2017 Israel	Clalit Health Services, the largest health maintenance organization in Israel	10	W/M	30,302/792	40-70	FBG ≥126 mg/dL and/or post-challenge glucose ≥200 mg/dL.	BMI	Baseline serum uric acid, age, SES, smoking, baseline eGFR, and baseline glucose
Simchoni, [1061] 2020 Israel	Israeli National Diabetes Registry	27.4	W/M	93,806/305	16-20	HbA1c ≥ 6.5% or serum glucose concentrations of ≥200 mg/dL in two tests performed at an interval of at least one month or ≥ 3 purchases of glucose lowering medications in different months	BMI	Birth year, age at study entry, education level, and cognitive score) in men and women
Sinn, [1062] 2019 Korea	The Samsung Medical Center Health Promotion Center in Seoul	4	W/M	51,463/5,370	(48.7)	FPG ≥126mg/dL, a self-reported history of diabetes or current use of anti-diabetic medications	BMI	Age, sex, smoking, and alcohol
Sloan, [1063] 2018 Japan	National Institutes of Biomedical Innovation, Health and Nutrition (NIBIOHN)	5.3	M	5,014/351	18-64 (48.5)	FPG ≥7.0 mmol/L (126 mg/dL)	BMI, WHtR	Age, systolic blood pressure, drinking habit, smoking habit, and family history of diabetes

Snijder, [1064] 2003 Netherlands	The Hoorn Study	6	W/M	1,357/132	50-75	Physician diagnosed	BMI, WC, HC, TC, WHR, WTR	Age, sex
Someya, [1065] 2019 Japan	Juntendo University Alumni Study	32	M	661/56	55 (50–59	Self-administered questionnaires	BMI	Age, year of graduation, and smoking
Son, [1066] 2015 Korea	Kangbuk Samsung Health Study	4	W/M	2,900/101	(44.3)	Self-questionnaires and FPG criteria outlined by ADA	BMI	Age, sex, glucose level, homeostatic model of the assessment of insulin resistance, total cholesterol level, triglyceride level, fat mass, hypertension status, smoking history, alcohol consumption, and vigorous exercise
Soriguer, [1067] 2008 Spain	Pizarra Study	6	W/M	714/81	18-65	Capillary blood glucose level >110 mg dL^{-1} or post OGTT blood glucose level >200 mg dL^{-1}	BMI, WC, WHR	Age, sex, obesity, increase in BMI, IRHOMA, family history of diabetes, increase in waist circumference, a high waist-to-hip ratio, hypertension and dyslipidaemia
Stolk, [1068] 1993 Netherlands	Zoetermeer	11.5	W/M	5,700/65	20-65 (50.4)	Use of oral hypoglycemic drugs and/or insulin	BMI	Age, sex, smoking, blood pressure
Sui, [1069] 2008 US	Cooper Clinic in Dallas, Texas	17	W	6,249/143	20-79	FPG ≥7 mmol/l (126 mg/dl)	BMI	Age, current smoking, alcohol intake, hypertension, family history of diabetes, survey response pattern, and BMI. §Adjusted for age, current smoking, alcohol intake, and hypertension, family history of diabetes, survey response pattern, and treadmill test duration.
Sung, [1070] 2001 Korea	Asan Medical Center in Seoul	5.95	W/M	2,531/117	17-80	Medical examination or a physician's diagnosis of diabetes in hospital records	BMI	Age, sex, family history of diabetes, smoking status, education

Tatsumi, [1071] 2013 Japan	Rural area of Nagano Prefecture in Japan	10.3	W	4,725/392	30-69	FPG ≥7.0 mmol/L (126 mg/dL) or 2-h post-prandial plasma glucose ≥11.1 mmol/L (200 mg/dL)	BMI	Age, blood glucose level, fasting status (yes, no), systolic blood pressure, total cholesterol and log transformed triglycerides, family history of diabetes, smoking status (current, ex- and non-smoker), habitual drinker (yes, no) and exercise habit (yes, no).
Ting, [1072] 2018 Taiwan	Department of Health Promotion and Examination of Chang Gung Memorial Hospital	8.87	W/M	8,450/2,068	18-91 (51)	ADA guideline	WC	Age, sex, education, marital status, occupation, hypertension
Tirosh, [1073] 2011 Israel	The MELANY study	17.4	M	37,674/1,173	17	FPG ≥126 mg per deciliter (7.0 mmol per liter)	BMI	Age, family history of diabetes, blood pressure, physical activity level, fasting glucose level, and triglyceride level
Tso, [1074] 2007 China	Population-based Hong Kong Cardiovascular Risk Factor Prevalence Study	10	W/M	544/96	51	WHO criteria	BMI	Sex, age, baseline BMI, 2-h post-OGTT glucose, HOMA-IR, adiponectin, hsCRP, and A-FABP in sex-specific median.
Tulloch-Reid, [1075] 2003 India	Pima Indian	5.25	W/M	1,614/322	>18	Medical records or FPG ≥7.0 mmol/l or 2-h blood glucose after a 75-g OGTT ≥11	BMI, HC, WC, WHR, WHtR, WTR, BF%	Age, sex
Urrutia, [1076] 2021 Spain	Basque Country	7	W/M	517/43	18-99 (52.3)	2-h post-prandial plasma glucose ≥11.1 mmol/L (200 mg/dL)	BMI	Age, sex, TG, HDL, family history of diabetes
Vaidya, [1077] 2016 China	The Kailuan study	4	W/M	100,279/4,867	18-98	FPG ≥7mmol/L, self-reported history, or active treatment with insulin or any oral hypoglycemic agent	BMI, WC, WHtR	Age, education, working environment, family history of diabetes, smoking, alcohol drinking, hypertension, and fasting plasma glucose

Valdes, [1078] 2007 Spain	The Asturias Study	6.3	W/M	700/44	30-75	FPG ≥126 mg/dl and/or 2-h plasma glucose ≥200 mg/dl	BMI	Age, sex
Verschuren, [1079] 2008 Netherlands	Doetinchem Cohort Study	5.6	W/M	3401/67	(46.7)	Validated self-reported	BMI	Age, sex, smoking status, physical activity, alcohol drinking, physical activity
Vijayakumar, [1080] 2019 India	Kerala State	10	W/M	869/190	44-74 (54.50)	Current use of hypoglycemic medication and/or FPG ≥126 mg/dL	BMI, WC	Age, sex, family history of diabetes, physical activity, hypertension, Hyper-cholesterolemia
Von Eckardesten, [1081] 2000 Germany	Prospective Cardiovascular Münster Study	6.3	M	3,737/200	36-60	FPG ≥7.0 mmol/l	BMI	Age, sex, blood pressure, TG, TC, LDL, HDL.
Wang, [1082] 2018 China	China MUCA and China Cardiovascular Health Study	8	W/M	15,680/536	35-74 (47.9)	FPG ≥7.0 mmol/L or the use of insulin or oral hypoglycemic agents, and/or a self-reported diabetes	BMI	Sex, cigarette smoking, alcohol drinking, geographic region, urbanization, work-related physical activity, educational level, family history of diabetes.
Wang, [1083] 2015 China	Chinese Multi-provincial Cohort Study	15	W/M	687/74	(48.1)	FPG ≥7.0 mmol/L or self-reported history or current use of insulin or oral hypoglycemic agents	BMI, WC, VAI	Age, sex
Wang, [1084] 2012 Taiwan	Taiwan's Kaohsiung County	8	W/M	3,446/337	35-79	FPG ≥126 mg/dL, a nonfasting glucose level ≥200 mg/dL, or using hypoglycemic drugs	BMI	Age, sex, education, smoking status, alcohol drinking
Wang, [1085] 2010 US	The Strong Heart Study	7.8	W/M	1,677/477	45-74	FPG ≥126 mg/dL, 2-h PG ≥200 mg/dL, or receiving insulin and/or hypoglycaemic agent treatment, or history of diabetes indicated via questionnaire	BMI, WC	Age, sex, body mass index (BMI), waist circumference, albuminuria (yes/no), smoking (current, past and never), family history of diabetes (yes/no), and quartiles of physical activity; additionally adjusted for gender for both sexes
Wang, [1086] 2015 China	The Kailuan prospective study	5.35	W/M	73,987/4,726	(49.76)	Taking of anti-diabetic medicine, or FPG ≥7.0mmol/L (126mg/dL)	BMI	Cigarette smoking, alcohol drinking, geographic region, urbanization, work-related physical activity, educational

								level and family history of diabetes
Wang, [1087] 2010 Australia	Aboriginal community in Australia's Northern Territory	11	W/M	686/124	20-74	Hospital and outpatient clinical records	BMI	Age, sex, fasting plasma glucose,
Wannamethee, [1088] 2010 UK	British Regional Heart Study (WC and WHR) and the British Women's Heart and Health Study	7	W/M	6,923/297	60-79	Doctor-diagnosed diabetes	BMI, WC, WHR	Age, sex, smoking, physical activity, alcohol intake, parental history of diabetes, pre-existing CHD, systolic blood pressure, HDL-C, log blood glucose.
Waring, [1089] 2010 US	Framingham Heart Study	10	W/M	1,476/217	40	FPG ≥200 mg/dL (11.1 mmol/L) and/or reported treatment with insulin or an oral hypoglycemic agent	BMI	Age, sex, weight status at age 25 years, ever use of hormones, alcohol consumption, smoking, education.
Watanabe, [1090] 2002 Japan	Japanese insurance company	5.7	W/M	5,636/264	(44)	FPG ≥7.0 mmol/L	BMI	Age, smoking, physical activity, alcohol intake, parental history of diabetes, pre-existing CHD, systolic blood pressure, HDL-C, log blood glucose
Wei, [1091] 2011 US	The San Antonio Heart Study	7.2	W/M	721/105	25-64	FPG ≥140 mg/dL and/or 2-hour post-load glucose ≥200 mg/dL	BMI, WC, HC, WHR	Age, sex, race.
Wei, [1092] 2020 China	The North Carolina State University Libraries	6	W/M	14,482/356	(43.7)	FPG ≥7.00 mmol/L and/or HbA1c ≥ 6.5% and/or self-reported diabetes previously diagnosed by a physician and/or current use of anti-hyperglycemic agents	BMI	Age, sex, hypertension
Wei, [1093] 1997 US	Framingham Heart Study	8.9	W/M	10,893/1,029	35-54	FPG ≥126 mg/dL, casual blood glucose ≥200 mg/dL, or using insulin or oral hypoglycemic medication	BMI	Age, sex
Wei, [1094] 2020 China	China Kadoorie Biobank	10	W/M	482,413/16,479	30-79	E11 and E12 codes	BMI, WC	Race, BMI, fasting glucose, HDL, triglycerides.
Wiroj, [1095] 2005 Thailand	The Chulalongkorn Memorial Hospital	1.67	W/M	6,924/136	35-60	FPG level was > 126 mg/dl (7.0 mmol/l)	BMI	Age, sex, physical activity, fasting plasma glucose.

Wu, [1096] 2017 China	Community-based study long term program for the incidence of metabolic diseases	5	W/M	2,383/350	25-90	FPG ≥7.0mmol/L, 2-h plasma glucose ≥11.1mmol/L, self-reported history, or current use of diabetes medication	VAI	Age, sex, hypertension, fasting plasma glucose.
Xia, [1097] 2018 China	The Changfeng Study		W/M	2,558/645	55-70 (61)	FPG s ≥7.0 mmol/L and/or the use of insulin or oral hypoglycemic agents and/or a self-reported history of diabetes	BMI, WC, VAI	Age, sex, smoking status, alcohol consumption, blood pressure, HbA1c, triglycerides, HDL-c
Xu, [1098] 2010 China	Nanjing City	3	W/M	3,031/260	(54.3)	FPG ≥7.0 mmol/L	BMI, WC, WHR, WHtR	Age, residence area, and educational attainment, family history of diabetes, cigarette smoking, alcohol drinking, TV viewing, physical activity, vegetables intake, meat intake, self-reported hypertension.
Xu, [1099] 2017 China	Guangzhou Biobank Cohort Study	3.6	W/M	15,752/1,812	50-95 (61)	FPG ≥7.0 mmol/l, glucose after 2-h OGTT ≥ 11.1 mmol/l, and/or self-reported physician-diagnosed diabetes	BMI, WC	Age, sex, occupation, physical activity, smoking and drinking.
Xu, [11000] 2020 China	Wujin District of Changzhou City, Jiangsu Province, China	7.77	W/M	15,717/867	(52.70)	FPG ≥ 7.0 mmol/l) or self-reported diabetes or the use of antidiabetic medication (oral agents or insulin) or a diagnosis of diabetes in the medical records	WC	Age, smoking status, drinking status, physical activity, family history of diabetes, family income, and education; adjusted for sex in the total population at the same time
Xue, [1101] 2015 China	China MUCA	8	W/M	24,996/1,101	35-74	FPG s ≥7.0 mmol/L and/or the use of insulin or oral hypoglycemic agents and/or a self-reported history of diabetes	WC	Region (north vs south), urbanization (urban vs rural), education level, cigarette smoking, alcohol consumption, work-related physical activity, family history of diabetes, hypertension, dyslipidemia, and impaired fasting glucose
Yamazaki, [1102] 2020 Japan	Keijinkai Maruyama Clinic, Sapporo	6.19	W/M	1,478/61	43-58 (52)	FPG ≥126 mg/ dL, HbA1c ≥6.5% (48 mmol/mol), or having a prescription for any anti-diabetes medication	BMI	Age, sex, BMI, liver attenuation, ethanol intake ≥ 20 g/day.

Yang, [1103] 2018 China	Dongfeng-Tongji cohort	4.6	W/M	9,962/614	(66.63)	Physician-diagnosed diabetes or taking diabetes medications (oral hypoglycemic agent or insulin) or FBG ≥7.0 mmol/L	BMI, WC, WHtR, VAI, ABSI	Age, smoking, drinking, physical activity, education level, hypertension, hyperlipidemia, fasting plasma glucose and family history of diabetes
Yokomichi, [1104] 2016 Japan	Yamanashi Prefecture	10	W/M	30,378/602	45-64	Commencement of diabetic therapies or HbA1c ≥6.5% (48 mmol/mol)	BMI	Age, weight change from the age of 20, BMI, smoking habits, alcohol consumption and physical activity, urbanization.
Zafra-Tanaka, [1105] 2020 Peru	CRONICAS Cohort Study	2.5	W/M	2,510/121	44.6-63.5 (54.1)	Taking specific medication for DM or FPG ≥126 mg/dl	BMI, WC, WHR, WHtR, BF%	Age, sex, study site, smoking, alcohol dependence and physical activity, history of hypertension, plasma glucose levels at baseline and family history of diabetes.
Zhang, [1106] 2016 China	Health Education Guidance Center of Heping District, Tianjin, China	4	W/M	4,078/241	(52.85)	FPG ≥126 mg/dl	BMI, WC, WHR, WHtR, VAI	Age, SBP, TC and LDL.
Zhang, [1107] 2016 China	Inner Mongolians	10	W/M	1,729/658	20-84	≥7.0 mmol/L fasting or ≥11.1mmol/l 2-h glucose) or validated physician diagnosis or the use of antidiabetic medication or medical records or death certificate	BMI	Age, sex
Zhao, [1108] 2020 Japan	NAGALA Study	5.4	W/M	15,462/373	18-79 (43.71)	FPG ≥7.0 mmol/L, HbA1c ≥6.5%	ABSI	Age, sex, smoking status, alcohol intake, BMI, fatty liver, systolic blood pressure, fasting blood glucose, HbA1c, HDL-cholesterol, triglycerides.
Zhou, [1109] 2021 UK	UK Biobank Study	11.2	W/M	381,363/4442	>20	ICD-10 code E11	BMI	Age, sex, smoking status, alcohol intake, BMI, fatty liver, SBP
Xu, [1110] 2019 China	The Tongxiang China Kadoorie Biobank prospective cohort study	6.9	W/M	53,817/1,766	(52.8)	FPG ≥7.00 mmol/L and/or reports of undergoing type 2 diabetes mellitus treatment	BMI	Geographic region, urbanization, education level, cigarette smoking, alcohol consumption, work-related

								physical activity, family history of diabetes, hypertension, dyslipidemia, and impaired fasting glucose

Abbreviations: ADIPOCAT, ADIPOsity in MONICA Catalonia; ALSWH, Australian Longitudinal Study on Women's Health; ALT, alanine aminotransferase; ARIC, Atherosclerosis Risk in Communities; ABSI, a body shape index; ADA, American Diabetes Association; AST, aspartate aminotransferase; BG, blood glucose; BLSA, Beijing Longitudinal Study on Aging; BMI, body mass index; BAI, body adiposity index; BF, body fat; BRHS, Biopsychosocial Religion and Health Study; BUN, blood urea nitrogen; China MUCA, China Multicenter Collaborative Study of Cardiovascular Epidemiology; BP, blood pressure; BS, blood sugar; CAAR, Center for Cardiometabolic Risk Reduction in South Asia Study; CPT-4, Current Procedural Terminology; CARDIA, The Coronary Artery Risk Development in Young Adults; CRP, c-reactive protein; CVD, cardiovascular disease; DBP, diastolic blood pressure; DPP, Diabetes Prevention Program; DM, diabetes mellitus; DESIR, Epidemiological Study on the Insulin Resistance Syndrome; EXTEDD45, EXamining ouTcomEs in chroNic Disease in the 45 and Up Study; EPIC, European Prospective Investigation into Cancer and Nutrition cohorts; ELSA-Brasil, Brazilian Longitudinal Study of Adult Health; FM, fat mass; FMI, fat mass index; FBG, fasting blood glucose; FPG, fasting plasma glucose; HPFS, Health Professionals Follow-up Study; HAPIEE, Health, Alcohol, and Psychosocial Factors in Eastern Europe; HALST, healthy aging longitudinal study in Taiwan; HEI, healthy eating index; HDL, high density lipoprotein cholesterol; HUNT, Nord-Trøndelag Health Study; HPHS, Harbin People's Health Study; HDNNCDS, Harbin Cohort Study on Diet, Nutrition and Chronic Non-communicable Diseases; HbA1c, hemoglobin A1c; HC, hip circumference; ICD-9-CM, International Classification of Diseases, 9th Revision Clinical Modification; JPHC, Japan Public Health Center-based prospective study on cancer and cardiovascular diseases; J-ECOH, Japan Epidemiology Collaboration on Occupational Health Study; KORA, Cooperative Health Research in the Region of Augsburg; LDL, low density lipoprotein cholesterol; MONICA, Monitoring Trends and Determinants on Cardiovascular Diseases; MESA, Multi-Ethnic Study of Atherosclerosis; MELANY, Metabolic, Lifestyle, and Nutrition Assessment in Young Adults; MCBS, Medicare Current Beneficiary Survey; M, men; NAGALA, NIBIOHN, National Institutes of Biomedical Innovation, Health and Nutrition; NAFLD in Gifu Area, Longitudinal Analysis; NHS, Nurses' Health Study; OGTT, oral glucose tolerance test; PA, physical activity; PMMJS, Prevention of MS and Multi-metabolic Disorders in Jiangsu Province of China Study; REACTION, Risk Evaluation of cAncers in Chinese diabeTic Individuals: a lONgitudinal; SAT, subcutaneous adipose tissue; SINDI, Singapore Indian Eye Study; SiMES, the Singapore Malay Eye Study; SAFHS, San Antonio Family Heart Study; SES, socio-economic status; SBP, systolic blood pressure; SWHS, Shanghai Women's Health Study; SRHS, The Saskatchewan Rural Health Study; TG, triglycerides; TLGS, The Tehran Lipid and Glucose Study; UA, uric acid; ULSAM, The community-based Uppsala Longitudinal Study of Adult Men; VAT, visceral adipose tissue; VAI, visceral adiposity index; WC, waist circumference; WHR, waist-hip ratio; WHtR, waist-height ratio; WHO, World Health Organization; WTR, waist to thigh ratio; W, women.

Table S4: ROBINS-I judgement for each domain and overall.

Study	Bias due to confounding	Bias due to selection of participants	Bias due to exposure assessment	Bias due to misclassification during follow-up	Bias due to missing data	Bias due to measurement of the outcome	Bias due to selective reporting of the results	Overall judgement
Adegbija, [899] 2015 Australia	Serious	Serious	Low	Moderate	Low	Low	Low	Serious
Aekplakorn, [900] 2006 Thailand	Moderate	Moderate	Low	Moderate	Low	Low	Low	Moderate
Alam, [901] 2020 Canada	Moderate	Moderate	Low	Moderate	Low	Low	Low	Moderate
Appleton, [902] 2013 Australia	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Ärnlov, [903] 2011 Sweden	Moderate	Moderate	Low	Moderate	Low	Low	Low	Moderate
Asghar, [904] 2011 Bangladesh	Moderate	Moderate	Low	Moderate	Low	Low	Low	Moderate
Bae, [905] 2020 Korea	Moderate	Moderate	Low	Moderate	Low	Low	Low	Moderate
Balkau, [906] 2011 France	Moderate	Moderate	Low	Moderate	Low	Low	Low	Moderate
Bancks, [907] 2017 US	Moderate	Moderate	Low	Moderate	Low	Low	Low	Moderate
Berkowitz, [908] 2016 US	Serious	Moderate	Low	Moderate	Low	Low	Low	Moderate
Biggs, [909] 2010	Moderate	Moderate	Low	Moderate	Low	Low	Low	Moderate

US								
Bjerregaard, [910] 2020 Demark and Finland	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Bjørnholt, [911] 2000 Norway	Moderate	Moderate	Low	Moderate	Low	Low	Low	Moderate
Bonora, [912] 2004 Italy	Moderate	Moderate	Low	Moderate	Moderate	Low	Low	Moderate
Bozorgmanesh, [913] 2011 Iran	Moderate	Moderate	Low	Moderate	Moderate	Low	Low	Moderate
Bragg, [914] 2018 China	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Brahimaj, [915] 2019 Netherlands	Moderate	Moderate	Low	Moderate	Low	Low	Low	Moderate
Burke, [916] 2007 Australia	Moderate	Moderate	Low	Moderate	Moderate	Low	Low	Moderate
Caerphilly collaborative group, [917] UK	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Cameron, [918] 2021 US	Moderate	Moderate	Low	Moderate	Moderate	Low	Low	Moderate
Carlsson, [919] 2007 Norway	Serious	Low	Low	Moderate	Moderate	Low	Low	Serious
Carvalho, [920] 2020 Brazil	Moderate	Moderate	Low	Moderate	Moderate	Low	Low	Moderate
Chan, [921] 2018 Singapore	Moderate	Moderate	Low	Moderate	Low	Low	Low	Moderate

Chang, [922] 2016 Korea	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Chei, [923] 2007 Japan	Moderate	Moderate	Low	Moderate	Moderate	Low	Low	Moderate
Chen, [924] 2014 China	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Chen, [925] 2017 Taiwan	Serious	Low	Low	Moderate	Moderate	Low	Low	Serious
Chen, [926] 2003 Taiwan	Serious	Serious	Low	Moderate	Low	Low	Low	Serious
Chen, [927] 2017 China	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Chen, [927] 2018 China	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Chung, [929] 2020 Japan	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Conway, [930] 2011 China	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Cugati, [931] 2007 Australia	Moderate	Moderate	Low	Moderate	Low	Serious	Low	Serious
Dai, [932] 2019 China	Serious	Low	Low	Moderate	Low	Low	Low	Serious
Dawson, [933] 2003 UK	Serious	Moderate	Low	Moderate	Low	Low	Low	Serious
de Oliveira, [934] 2019	Moderate	Moderate	Low	Moderate	Low	Low	Low	Moderate

Brazil								
DeJesus, [935] 2016 US	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Derakhshan, [936] 2014 Iran	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Ding, [937] 2020 China	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Dotevall, [938] 2003 Sweden	Moderate	Moderate	Low	Moderate	Moderate	Low	Low	Moderate
Dunstan, [939] 2002 Australia	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Ebrahimi, [940] 2016 Iran	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Fan, [941] 2020 China	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Feng, [942] 2018 Canada	Serious	Low	Low	Moderate	Low	Serious	Low	Serious
Feng, [943] 2021 China	Serious	Low	Low	Moderate	No information	Low	Low	Serious
Feng, [944] 2020 China	Serious	Low	Low	Moderate	No information	Low	Low	Serious
Fingeret, [945] 2018 Switzerland	Serious	Low	Low	Moderate	Low	Low	Low	Serious
Ford, [946] 1997 US	Serious	Low	Low	Moderate	Low	Low	Low	Serious

Fujita, [947] 2008 Japan	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Fukuda, [948] 2016 Japan	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Gil-Montalbán, [949] 2015 Spain	Moderate	Moderate	Low	Moderate	Moderate	Low	Low	Moderate
Diabetes Prevention Program, [950] 2006 US	Serious	Serious	Low	Moderate	Low	Low	Low	Serious
Hackett, [951] 2020 UK	Moderate	Low	Low	Moderate	Low	Serious	Low	Serious
Hadaegh, [952] 2009 Iran	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Hadaegh, [953] 2006 Iran	Moderate	Moderate	Low	Moderate	Low	Low	Low	Moderate
Haffner, [954] 1991 US	Serious	Serious	Low	Moderate	Moderate	Low	Low	Serious
Han, [955] 2017 China	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Hardy, [956] 2016 US	Serious	Low	Low	Moderate	Moderate	Low	Low	Serious
Hart, [957] 2006 UK	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Hartwig [958] 2015, German	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
He, [959] 2013	Moderate	Serious	Low	Moderate	No information	Low	Low	Moderate

China								
Heianza, [960] 2012 Japan	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Hinnouho, [961] 2015 UK	Moderate	Low	Low	Moderate	No information	Low	Low	Moderate
Hjerkind, [962] 2016 Norway	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Holtermann, [963] 2006 Denmark	Moderate	Moderate	Low	Moderate	Low	Low	Low	Moderate
Hu, [964] 2006 Finland	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Hu, [965] 2017 Japan	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Huerta, [966] 2013 Spain	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Hwang, [967] 2015 US	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Ishikawa-Takata, [968] 2002 Japan	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Jackson, [969] 2015 US	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Jacobsen, [970] 2002 Norway	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Jacobs-van der Bruggen, [971] 2010 Netherlands	Serious	Moderate	Low	Moderate	Low	Moderate	Low	Serious

Jae, [972] 2016 Korea	Moderate	Moderate	Low	Moderate	Low	Low	Low	Moderate
Jafari-Koshki, [973] 2016 Iran	Serious	Moderate	Low	Moderate	Low	Low	Low	Serious
Janghorbani, [974] 2010 Iran	Serious	Serious	Low	Moderate	Low	Low	Low	Serious
Janghorbani, [975] 2012 Iran	Serious	Moderate	Low	Moderate	Low	Low	Low	Serious
Janghorbani, [976] 2016 Iran	Serious	Moderate	Low	Moderate	Low	Low	Low	Serious
Jia, [977] 2011 China	Moderate	Low	Low	Moderate	No information	Low	Low	Moderate
Jung, [978] 2016 Korea	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Jung, [979] 2017 Korea	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Jung, [980] 2014 Korea	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Kametani, [981] 2002 Japan	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Kanaya, [982] 2006 US	Moderate	Moderate	Low	Moderate	Low	Low	Low	Moderate
Kaneto, [983] 2013 Japan	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Kang, [984] 2020	Moderate	Moderate	Low	Moderate	No information	Low	Low	Moderate

China								
Katzmarzyk, [985] 2007 Canada	Moderate	Moderate	Low	Moderate	Low	Serious	Low	Moderate
Kim, [986] 2019 Korea	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Kittithaworn, [987] 2019 Thailand	Moderate	Moderate	Low	Moderate	Moderate	Low	Low	Moderate
Klein, [988] 2002 US	Serious	Low	Low	Moderate	Moderate	Low	Low	Serious
Koloverou, [989] 2019 Greece	Moderate	Low	Low	Moderate	No information	Low	Low	Moderate
Kotronen, [990] 2013 Finland	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Kulick, [991] 2015 US	Moderate	Moderate	Low	Moderate	Low	Serious	Low	Serious
Kuwabara, [992] 2017 Japan	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Lamichhane, [993] 2020 US	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Lee, [994] 2009 US	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Lee, [995] 2016 Korea	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Lee, [996] 2020 Korea	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate

Ley, [997] 2009 Canada	Serious	Serious	Low	Moderate	Low	Low	Low	Serious
Li, [998] 2015 China	Moderate	Low	Low	Moderate	No information	Low	Low	Moderate
Li, [999] 2012 Japan	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Lissner, [1000] 2001 Sweden	Moderate	Moderate	Low	Moderate	Low	Low	Low	Moderate
Liu, [1001] 2013 China	Moderate	Moderate	Low	Moderate	No information	Low	Low	Moderate
Liu, [1002] 2020 US	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Liu, [1003] 2020 China	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Liu, [1004] 2016 China	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Liu, [1005] 2020 China	Moderate	Serious	Low	Moderate	Moderate	Serious	Low	Serious
Lorenzo, [1006] 2009 US	Serious	Low	Low	Moderate	Low	Low	Low	Serious
Luo, [1007] 2015 China	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Luo, [1008] 2015 China	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Luo, [1009] 2018	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate

US								
Lv, [1010] 2017 China	Moderate	Low	Low	Moderate	No information	Low	Low	Moderate
Lyssenko, [1011] 2011 Denmark	Serious	Low	Low	Moderate	Low	Low	Low	Serious
Ma, [1012] 2020 China	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Magliano, [1013] 2008 Australia	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Marott, [1014] 2016 Denmark	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
McDermott, [1015] 2010 Australia	Moderate	Moderate	Low	Moderate	Low	Low	Low	Moderate
Mehlig, [1016] 2014 Sweden	Moderate	Moderate	Low	Moderate	Low	Low	Low	Moderate
Meigs, [1017] 2006 US	Serious	Moderate	Low	Moderate	Moderate	Low	Low	Serious
Meisinger, [1018] 2006 Denmark	Moderate	Low	Low	Moderate	Moderate	Serious	Low	Serious
Miller, [1019] 1996 Trinidad	Serious	Low	Low	Moderate	Low	Low	Low	Serious
Mitsuhashi, [1020] 2017 Japan	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Monterrosa, [1021] 1995 US	Moderate	Serious	Low	Moderate	Low	Low	Low	Moderate

Mukai, [1022] 2009 Japan	Moderate	Moderate	Low	Moderate	Moderate	Low	Low	Moderate
Mustafina, [1023] 2021 Eastern Europe	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Nagaya, [1024] 2004 Japan	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Nakanishi, [1025] 2003 Japan	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Namayandeh, [1026] 2019 Iran	Moderate	Moderate	Low	Moderate	Low	Low	Low	Moderate
Narayan, [1027] 2020 India, Pakistan and US	Serious	Low	Low	Moderate	Low	Low	Low	Serious
Narisada, [1028] 2021 Japan	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Navarro-Gonzále, [1029] 2016 Spain	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Nemesure, [1030] 2008 US	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Nichols, [1031] 2008 US	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Njølstad, [1032] 1998 Norway	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Novak, [1033] 2012 Sweden	Serious	Low	Low	Moderate	Low	Low	Low	Serious
Nyamdorj, [1034] 2008	Moderate	Moderate	Low	Moderate	No information	Low	Low	Moderate

Mauritius								
Oh, [1035] 2021 Korea	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Okada, [1036] 2021 Japan	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Okamura, [1037] 2019 Japan	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Onat, [1038] 2010 Turkey	Moderate	Low	Low	Moderate	No information	Low	Low	Moderate
Ould Setti [1039] 2019 Finland	Moderate	Moderate	Low	Moderate	Moderate	Low	Low	Moderate
Pajunen, [1040] 2013 Finland	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Park, [1041] 2018 Korea	Serious	Low	Low	Moderate	Low	Low	Low	Serious
Parker, [1042] 2008 US	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Poljičanin, [1043] 2012 Croatia	Moderate	Low	Low	Moderate	No information	Serious	Low	Moderate
Rathmann, [1044] 2009 Germany	Serious	Moderate	Low	Moderate	Low	Serious	Low	Serious
Regmi, [1045] 2020 UAE	Moderate	Moderate	Low	Moderate	Moderate	Low	Low	Moderate
Ronaldsson, [1046] 2001 Sweden	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate

Ryu, [1047] 2004 Korea	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Sakurai, [1048] 2009 Japan	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Salminen, [1049] 2015 Finland	Moderate	Serious	Low	Moderate	Moderate	Low	Low	Serious
Sanada, [1050] 2012 Japan	Moderate	Moderate	Low	Moderate	Low	Low	Low	Moderate
Sans, [1051] 2013 Spain	Moderate	Moderate	Low	Moderate	Moderate	Low	Low	Moderate
Sares-Jäske, [1052] 2020 Finland	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Sargeant, [1053] 2002 Jamaica	Moderate	Serious	Low	Moderate	No information	Low	Low	Serious
Sasai, [1054] 2010 Japan	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Sattar, [1055] 2003 Scotland	Serious	Low	Low	Moderate	Low	Low	Low	Serious
Sawada, [1056] 2010 Japan	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Schmidt, [1057] 2013 Denmark	Serious	Low	Low	Moderate	Low	Low	Low	Serious
Schulze, [1058] 2012 Germany	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Seclen, [1059] 2017	Moderate	Serious	Low	Moderate	Low	Low	Low	Serious

Peru								
Shani, [1060] 2017 Israel	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Simchoni, [1061] 2020 Israel	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Sinn, [1062] 2019 Korea	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Sloan, [1063] 2018 Japan	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Snijder, [1064] 2003 Netherlands	Serious	Moderate	Low	Moderate	Low	Low	Low	Serious
Someya, [1065] 2019 Japan	Moderate	Serious	Low	Moderate	Low	Serious	Low	Serious
Son, [1066] 2015 Korea	Moderate	Moderate	Low	Moderate	Low	Serious	Low	Serious
Soriguer, [1067] 2008 Spain	Moderate	Serious	Low	Moderate	Low	Low	Low	Serious
Stolk, [1068] 1993 Netherlands	Moderate	Low	Low	Moderate	Low	Serious	Low	Serious
Sui, [1069] 2008 US	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Sung, [1070] 2001 Korea	Moderate	Moderate	Low	Moderate	Moderate	Low	Low	Moderate
Tatsumi, [1071] 2013 Japan	Moderate	Moderate	Low	Moderate	Low	Low	Low	Moderate

Ting, [1072] 2018 Taiwan	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Tirosh, [1073] 2011 Israel	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Tso, [1074] 2007 China	Moderate	Serious	Low	Moderate	Low	Low	Low	Serious
Tulloch-Reid, [1075] 2003 India	Serious	Moderate	Low	Moderate	Low	Low	Low	Moderate
Urrutia, [1076] 2021 Spain	Moderate	Serious	Low	Moderate	Low	Low	Low	Serious
Vaidya, [1077] 2016 China	Moderate	Low	Low	Moderate	No information	Low	Low	Moderate
Valdes, [1078] 2007 Spain	Serious	Serious	Low	Moderate	Low	Low	Low	Serious
Verschuren, [1079] 2008 Netherlands	Moderate	Low	Low	Moderate	Moderate	Serious	Low	Serious
Vijayakumar, [1080] 2019 India	Moderate	Serious	Low	Moderate	Moderate	Low	Low	Serious
Von Eckardesten, [1081] 2000 Germany	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Wang, [1082] 2018 China	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Wang, [1083] 2015 China	Serious	Serious	Low	Moderate	Low	Low	Low	Serious
Wang, [1084] 2012	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate

Taiwan								
Wang, [1085] 2010 US	Moderate	Moderate	Low	Moderate	Low	Low	Low	Moderate
Wang, [1086] 2015 China	Moderate	Low	Low	Moderate	No information	Low	Low	Moderate
Wang, [1087] 2010 Australia	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Wannamethee, [1088] 2010 UK	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Waring, [1089] 2010 US	Moderate	Moderate	Low	Moderate	Low	Low	Low	Moderate
Watanabe, [1090] 2002 Japan	Moderate	Moderate	Low	Moderate	Low	Low	Low	Moderate
Wei, [1091] 2011 US	Serious	Serious	Low	Moderate	Low	Low	Low	Serious
Wei, [1092] 2020 China	Serious	Low	Low	Moderate	Low	Low	Low	Serious
Wei, [1093] 1997 US	Serious	Low	Low	Moderate	Low	Low	Low	Serious
Wei, [1094] 2020 China	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Wiroj, [1095] 2005 Thailand	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Wu, [1096] 2017 China	Moderate	Moderate	Low	Moderate	Moderate	Low	Low	Moderate

Xia, [1097] 2018 China	Moderate	Moderate	Low	Moderate	Moderate	Low	Low	Moderate
Xu, [1098] 2010 China	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Xu, [1099] 2017 China	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Xu, [1100] 2020 China	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Xue, [1101] 2015 China	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Yamazaki, [1102] 2020 Japan	Moderate	Moderate	Low	Moderate	Moderate	Low	Low	Moderate
Yang, [1103] 2018 China	Moderate	Low	Low	Moderate	No information	Low	Low	Moderate
Yokomichi, [1104] 2016 Japan	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate
Zafra-Tanaka, [1105] 2020 Peru	Moderate	Moderate	Low	Moderate	No information	Low	Low	Moderate
Zhang, [1106] 2016 China	Serious	Moderate	Low	Moderate	Moderate	Low	Low	Serious
Zhang, [1107] 2016 China	Serious	Low	Low	Moderate	Moderate	Low	Low	Serious
Zhao, [1108] 2020 Japan	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate
Zhou, [1109] 2021	Moderate	Low	Low	Moderate	Low	Low	Low	Moderate

UK								
Xu, [1100] 2019 China	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate

Table S5. Subgroup analysis of waist circumference (10 cm higher) and risk of type 2 diabetes.

	n	Relative risk (95%CI)	I^2 (%), $P_{heterogeneity}$ [1]	Tau-squared	$P_{between}$ [2]
All studies	78	1.61 (1.52, 1.70)	99%, <0.001	0.0492	-
Sex					0.90
Men	38	1.68 (1.54, 1.82)	95%, <0.001	0.0562	
Women	38	1.68 (1.56, 1.81)	98%, 0.0476		
Age (years)					-
>60 years	6	1.46 (1.20, 1.78)	92%, <0.001	0.0535	
Region					<0.001
North America	14	1.69 (1.48, 1.93)	98%, <0.001	0.0555	
Europe	17	2.00 (1.79, 2.45)	93%, <0.001	0.0425	
East Asia	32	1.51 (1.37, 1.66)	99%, <0.001	0.0634	
South Asia	3	1.26 (1.18, 1.34)	11%, 0.32	0.0006	
Southeast Asia	-	-	-	-	
Middle East	4	1.38 (1.10, 1.73)	72%, 0.01	0.0387	
Australia	4	1.53 (1.25, 1.86)	79%, 0.003	0.0301	
South America	3	1.34 (1.26, 1.43)	0%, 0.54	0.0000	
Africa	1	1.45 (1.32, 1.60)	-	-	
Race					0.62
White	2	1.50 (1.26, 1.78)	85%, 0.01	0.0134	
Black	3	1.60 (1.15, 2.23)	99%, <0.001	0.0807	
Hispanic	1	1.44 (1.38, 1.50)	-	-	
Number of cases					0.82
<500	49	1.61 (1.50, 1.73)	91%, <0.001	0.0479	
500-1000	11	1.54 (1.26, 1.87)	99%, <0.001	0.1061	
1000-5000	12	1.61 (1.39, 1.87)	98%, <0.001	0.0650	
>5000	6	1.76 (1.46, 2.12)	99%, <0.001	0.0450	
Follow-up duration (years)					<0.001
<5	17	1.34 (1.24, 1.44)	88%, <0.001	0.0167	
5-10	33	1.59 (1.45, 1.75)	99%, <0.001	0.0691	
10-15	17	1.74 (1.53, 1.97)	98%, <0.001	0.0614	
15-20	8	2.50 (1.90, 3.30)	78%, 0.001	0.1165	
>20	3	1.50 (1.14, 1.98)	95%, <0.001	0.0556	
Exclusion of pre-existing diseases					0.09
Yes	13	1.43 (1.33, 1.53)	98%, <0.001	0.0117	
No	65	1.67 (1.53, 1.82)	99%, <0.001	0.1117	
Risk of bias					0.40
Low	-	-	-		-
Moderate	61	1.59 (1.50, 1.68)	99%, <0.001	0.1058	
Serious	17	1.70 (1.44, 2.00)	91%, <0.001	0.1024	
Study design					0.13
Prospective cohort	74	1.63 (1.53, 1.73)	99%, <0.001	0.0138	
Retrospective cohort	4	1.56 (1.30, 1.74)	90%, 0.001	0.0115	
Exposure assessment					0.19
Baseline assessment	65	1.57 (1.48, 1.67)	99%, <0.001	0.0496	
Repeated measurement	13	1.78 (1.52, 2.08)	97%, <0.001	0.0469	
Case ascertainment					0.01

Blood measurement	22	1.52 (1.40, 1.63)	91%, <0.001	0.0250	
Self-reported	4	1.86 (1.58, 2.06)	99%, <0.001	0.1655	
Registries	5	1.90 (1.75, 2.06)	86%, <0.001	0.0023	
Mixed methods	47	1.57 (1.45, 1.70)	98%, <0.001	0.0677	
Adjustments for confounders					
Age					0.75
Yes	75	1.60 (1.52, 1.69)	99%, <0.001	0.0474	
No	3	1.72 (1.42, 2.10)	93%, <0.001	0.0252	
Sex					0.04
Yes	71	1.63 (1.54, 1.72)	98%, <0.001	0.0498	
No	7	1.42 (1.27, 1.60)	82%, <0.001	0.0204	
Smoking status					0.01
Yes	52	1.64 (1.54, 1.75)	98%, <0.001	0.0526	
No	26	1.49 (1.39, 1.59)	87%, <0.001	0.0187	
Alcohol drinking					0.87
Yes	51	1.61 (1.52, 1.70)	99%, <0.001	0.0515	
No	27	1.59 (1.46, 1.72)	92%, <0.001	0.0358	
Physical activity					<0.001
Yes	43	1.61 (1.52, 1.70)	99%, <0.001	0.0532	
No	35	1.46 (1.38, 1.55)	89%, <0.001	0.0223	
Family history of diabetes					0.20
Yes	41	1.64 (1.52, 1.78)	99%, <0.001	0.0580	
No	37	1.56 (1.46, 1.66)	94%, <0.001	0.0306	
All abovementioned confounders					0.07
Yes	24	1.70 (1.53, 1.88)	97%, <0.001	0.0591	
No	54	1.55 (1.47, 1.64)	98%, <0.001	0.0321	
Adjustments for intermediates					
Blood glucose					0.35
Yes	27	1.68 (1.52, 1.70)	97%, <%0.001	0.0836	
No	51	1.58 (1.48, 1.69)	99%, <0.001	0.0484	
Blood pressure					0.19
Yes	40	1.66 (1.48, 1.87)	98%, <0.001	0.0344	
No	38	1.57 (1.48, 1.67)	99%, <0.001	0.0318	
Blood glucose and blood pressure					0.44
Yes	25	1.68 (1.51, 1.93)	99%, <0.001	0.0508	
No	57	1.61 (1.51, 1.71)	99%, <0.001	0.0853	
Adjustment for all abovementioned confounders and intermediates					0.45
Yes	11	1.68 (1.38, 2.04)	91%, <0.001	0.1015	
No	67	1.60 (1.51, 1.69)	99%, <0.001	0.0486	

[1] p for heterogeneity within each subgroup

[2] p for heterogeneity between subgroups using meta-regression analyses

Table S6. Subgroup analysis of waist-to-hip ratio (0.1 unit higher) and risk of type 2 diabetes

	n	Relative risk (95%CI)	I^2 (%), $P_{heterogeneity}$ [1]	Tau-squared	$P_{between}$ [2]
All studies	34	1.63 (1.50, 1.78)	99%, <0.001	0.0535	-
Sex					0.89
Men	21	1.67 (1.47, 1.90)	83%, <0.001	0.0602	
Women	22	1.71 (1.54, 1.90)	98%, <0.001	0.0473	
Age (years)					-
>60 years	3	1.57 (1.08, 2.90)	92%, <0.001	0.0985	
Region					<0.001
North America	7	1.53 (1.31, 1.75)	94%, <0.001	0.0322	
Europe	7	2.05 (1.75, 2.38)	77%, <0.001	0.0218	
East Asia	10	1.73 (1.24, 2.43)	99%, <0.001	0.2784	
South Asia	1	1.65 (1.35, 2.02)	-	-	
Southeast Asia	-	-	-	-	
Middle East	4	1.21 (1.04, 1.42)	8%, 0.34	0.0021	
Australia	2	1.50 (1.01, 2.18)	84%, <0.001	0.0660	
South America	2	1.10 (1.04, 1.16)	0%, 1.0	0.0000	
Africa	1	1.45 (1.30, 1.61)	-	-	
Race					0.40
White	3	1.55 (0.98, 2.76)	94%, <0.001	0.0712	
Black	2	1.46 (1.01, 2.14)	94%, <0.001	0.1428	
Hispanic	1	1.23 (1.19, 1.27)	-	-	
Number of cases					0.82
<500	24	1.62 (1.43, 1.83)	88%, <0.001	0.0725	
500-1000	3	1.53 (0.92, 2.55)	98%, <0.001	0.1341	
1000-5000	4	1.98 (1.75, 2.23)	81%, <0.001	0.0146	
>5000	3	1.41 (1.13, 1.75)	99%, <0.001	0.0386	
Follow-up duration (years)					<0.001
<5	10	1.47 (1.21, 1.76)	82%, <0.001	0.0661	
5-10	13	1.74 (1.52, 1.98)	99%, <0.001	0.0546	
10-15	8	1.57 (1.32, 1.88)	83%, <0.001	0.0506	
15-20	3	1.80 (1.27, 2.54)	82%, 0.01	0.0761	
>20	-	-	-	-	
Exclusion of pre-existing diseases					0.09
Yes	8	1.65 (1.32, 2.06)	93%, <0.001	0.0864	
No	26	1.64 (1.48, 1.81)	98%, <0.001	0.0548	
Risk of bias					
Low	-	-	-	-	0.35
Moderate	28	1.65 (1.51, 1.80)	97%, <0.001	0.0501	
Serious	6	1.60 (1.41, 1.82)	91%, <0.001	0.1142	
Study design					-
Prospective cohort	34	1.63 (1.50, 1.78)	99%, <0.001	0.0535	
Retrospective cohort	-	-	-	-	
Exposure assessment					0.19
Baseline assessment	27	1.61 (1.41, 1.77)	97%, <0.001	0.3018	
Repeated measurement	7	1.79 (1.18, 2.71)	95%, <0.001	0.0524	

Case ascertainment					0.01
Blood measurement	14	1.66 (1.38, 1.92)	95%, <0.001	0.1030	
Self-reported	4	2.00 (1.41, 2.74)	99%, <0.001	0.1224	
Registries	-	-	-	-	
Mixed methods	16	1.54 (1.32, 1.79)	97%, <0.001	0.0830	
Adjustments for confounders					
Age					0.75
Yes	30	1.65 (1.50, 1.82)	98%, <0.001	0.0543	
No	4	1.82 (1.25, 2.64)	98%, <0.001	0.1427	
Sex					0.04
Yes	29	1.60 (1.47, 1.73)	98%, <0.001	0.0357	
No	5	1.77 (1.24, 2.53)	90%, <0.001	0.0596	
Smoking status					0.01
Yes	17	1.69 (1.42, 2.02)	96%, <0.001	0.1221	
No	17	1.61 (1.39, 1.86)	91%, <0.001	0.0794	
Alcohol drinking					0.87
Yes	19	1.79 (1.49, 2.15)	97%, <0.001	0.1500	
No	15	1.70 (1.50, 1.91)	92%, <0.001	0.0505	
Physical activity					<0.001
Yes	16	1.76 (1.45, 2.13)	96%, <0.001	0.1360	
No	18	1.57 (1.36, 1.80)	98%, <0.001	0.0760	
Family history of diabetes					0.20
Yes	15	1.67 (1.48, 1.88)	91%, <0.001	0.0390	
No	19	1.62 (1.34, 1.96)	99%, <0.001	0.1656	
All abovementioned confounders					0.08
Yes	7	1.90 (1.50, 2.40)	84%, <0.001	0.0808	
No	27	1.58 (1.43, 1.74)	99%, <0.001	0.0515	
Adjustments for intermediates					
Blood glucose					0.35
Yes	8	1.80 (1.40, 2.32)	93%, <0.001	0.1047	
No	26	1.61 (1.39, 1.87)	97%, <0.001	0.1374	
Blood pressure					0.19
Yes	12	1.57 (1.39, 1.77)	92%, <0.001	0.0316	
No	22	1.69 (1.41, 2.02)	97%, <0.001	0.1693	
Blood glucose and blood pressure					0.33
Yes	7	1.77 (1.35, 2.32)	93%, <0.001	0.1059	
No	27	1.62 (1.40, 1.88)	98%, <0.001	0.1381	
Adjustment for all abovementioned confounders and intermediates					0.45
Yes	2	2.41 (1.96, 2.96)	0%, 0.72	0.0000	
No	32	1.60 (1.46, 1.75)	98%, <0.001	0.0526	

[1] p for heterogeneity within each subgroup
[2] p for heterogeneity between subgroups using meta-regression analyses

Table S7. Subgroup analysis of waist-to-height ratio (0.1 unit higher) and risk of type 2 diabetes.

	n	Relative risk (95%CI)	I^2 (%), $P_{heterogeneity}$ [1]	Tau-squared	$P_{between}$ [2]
All studies	25	1.73 (1.51, 1.98)	97%, <0.001	0.0996	-
Sex					0.86
Men	16	1.74 (1.62, 1.90)	82%, <0.001	0.0430	
Women	15	1.72 (1.61, 1.86)	86%, <0.001	0.0413	
Region					<0.001
North America	4	1.79 (1.39, 2.31)	96%, <0.001	0.0588	
Europe	2	2.42 (2.21, 2.64)	0%, 1.0	0.0000	
East Asia	12	1.62 (1.35, 1.95)	93%, <,0.001	0.0844	
South Asia	1	1.58 (1.38, 1.80)	-	-	
Southeast Asia	-	-	-	-	
Middle East	3	1.72 (1.25, 2.36)	27%, 0.08	0.0244	
Australia	-	-	-	-	
South America	2	1.71 (1.30, 2.27)	8%, 0.30	0.0034	
Africa	1	1.51 (1.33, 1.72)	-	-	
Race					
White	1	2.04 (1.95, 2.14)	-		<0.001
Black	2	1.58 (1.50, 1.67)	0%, 0.42		
Number of cases					0.83
<500	7	1.68 (1.29,2.17)	98%, <0.001	0.0097	
>500	18	1.71 (1.59, 1.85)	5%, 0.008	0.1167	
Follow-up duration (years)					0.02
<5	12	1.66 (1.49, 1.89)	75%, <0.001	0.0290	
5-10	6	1.51 (1.11, 2.07)	98%, <0.001	0.1416	
>10	7	2.01 (1.79, 2.26)	56%, <0.001	0.0112	
Exclusion of pre-existing diseases					0.88
Yes	7	1.77 (1.62, 1.93)	0%, 0.78	0.0000	
No	18	1.73 (1.48, 2.04)	98%, <0.001	0.1030	
Risk of bias					0.61
Low	-	-	-		-
Moderate	18	1.74 (1.40, 2.12)	90%, <0.001	0.0825	
Serious	7	1.62 (1.39, 1.86)	97%, <0.001	0.0902	
Study design					0.25
Prospective cohort	24	1.71 (1.49, 1.97)	98%, <0.001	0.0993	
Retrospective cohort	1	2.31 (1.48, 3.62)	-	-	
Exposure assessment					0.75
Baseline assessment	21	1.72 (1.48, 2.00)	98%, <0.001	0.1005	
Repeated measurement	4	1.79 (1.54, 2.13)	43%, 0.15	0.0133	
Case ascertainment					0.42
Blood measurement	9	1.62 (1.30, 2.00)	87%, <0.001	0.0699	
Self-reported	1	1.87 (1.47, 2.28)	-	-	
Registries	1	1.42 (0.95, 2.13)	-	-	
Mixed methods	14	1.82 (1.67, 1.99)	76%, <0.001	0.0149	
Adjustments for confounders					
Age					<0.001

Yes	24	1.70 (1.49, 1.94)	97%, <0.001	0.0878	
No	1	2.45 (2.21, 2.72)	-	-	
Sex					0.28
Yes	24	1.74 (1.51, 2.00)	97%, <0.001	0.1025	
No	1	1.58 (1.38, 1.80)	-	-	
Smoking status					0.21
Yes	16	1.76 (1.43, 2.17)	97%, <0.001	0.1599	
No	9	1.64 (1.41, 1.90)	90%, <0.001	0.0344	
Alcohol drinking					0.21
Yes	16	1.76 (1.43, 2.17)	97%, <0.001	0.1599	
No	9	1.64 (1.41, 1.90)	90%, <0.001	-	
Physical activity					0.053
Yes	11	1.86 (1.41, 2.44)	98%, <0.001	0.1950	
No	14	1.60 (1.43, 1.79)	85%, <0.001	0.0286	
Family history of diabetes					0.15
Yes	12	1.63 (1.51, 1.76)	28%, 0.17	0.0046	
No	13	1.83 (1.50, 2.23)	98%, <0.001	0.1129	
All abovementioned confounders					0.67
Yes	6	1.79 (1.64, 1.95)	0%, 0.73	0.0000	
No	19	1.72 (1.47, 2.02)	98%, <0.001	0.1024	
Adjustments for intermediates					
Blood glucose					0.15
Yes	9	1.61 (1.44, 1.80)	47%, 0.06	0.0115	
No	16	1.75 (1.47, 2.10)	98%, <0.001	0.1083	
Blood pressure					0.04
Yes	14	1.60 (1.36, 1.88)	92%, <0.001	0.0720	
No	11	1.88 (1.62, 2.17)	93%, <0.001	0.0473	
Blood glucose and blood pressure					0.15
Yes	8	1.58 (1.41, 1.77)	35%, 0.15	0.0083	
No	17	1.77 (1.47, 2.13)	98%, <0.001	0.1107	
Adjustment for all abovementioned confounders and intermediates					0.84
Yes	4	1.77 (1.61, 1.94)	0%, 0.49	0.0000	
No	21	1.74 (1.49, 2.02)	98%, <0.001	0.1022	

[1] p for heterogeneity within each subgroup
[2] p for heterogeneity between subgroups using meta-regression analyses

Table S8. Subgroup analysis of visceral adiposity index (1 unit higher) and risk of type 2 diabetes.

	n	Relative risk (95%CI)	I^2 (%), $P_{heterogeneity}$ [1]	Tau-squared	$P_{between}$ [2]
All studies	9	1.42 (1.27, 1.58)	84%, <0.001	0.0222	-
Sex					0.97
Men	2	1.62 (1.39, 1.89)	0%, 0.69	0.0000	
Women	2	1.63 (1.40, 1.88)	0%, 0.72	0.0000	
Region					0.26
North America	1	1.19 (0.95, 1.49)	-	-	
Europe	1	1.25 (1.12, 1.40)	-	-	
East Asia	5	1.57 (1.28, 1.92)	89%, <0.001	0.0461	
South Asia	-	-	-	-	
Southeast Asia	-	-	-	-	
Middle East	2	1.33 (1.08, 1.63)	87%, 0.005	0.0195	
Australia	-	-	-	-	
South America	-	-	-	-	
Africa	-	-	-	-	
Follow-up duration (years)					0.01
<5	1	1.68 (1.35, 2.09)	-	-	
5-10	6	1.47 (1.27, 1.70)	84%, <0.001	0.0268	
>10	2	1.22 (1.14, 1.31)	0%, 0.57	0.0000	
Exclusion of pre-existing diseases					0.12
Yes	1	1.25 (1.12, 1.40)	-	-	
No	8	1.45 (1.28, 1.64)	85%, <0.001	0.0258	
Risk of bias					0.45
Low	-	-	-	-	-
Moderate	7	1.33 (1.20, 1.50)	78%, <0.001	0.0204	
Serious	2	1.49 (1.09, 2.00)	92%, <0.001	0.0405	
Study design					-
Prospective cohort	9	1.42 (1.27, 1.58)	84%, <0.001	0.0222	
Retrospective cohort	-	-	-	-	
Exposure assessment					-
Measured	9	1.42 (1.27, 1.58)	84%, <0.001	0.0222	
Self-reported	-	-	-	-	
Both	-	-	-	-	
Exposure assessment					-
Baseline assessment	9	1.42 (1.27, 1.58)	84%, <0.001	0.0222	
Repeated measurement	-	-	-	-	0.09
Case ascertainment					
Blood measurement	1	1.60 (1.42, 1.81)	-	-	
Self-reported	-	-	-	-	
Registries	-	-	-	-	
Mixed methods	8	1.39 (1.24, 1.57)	83%, <0.001	0.0217	
Adjustments for confounders					
Age					-
Yes	9	1.42 (1.27, 1.58)	84%, <0.001	0.0222	
No	-	-	-	-	

Sex					-
Yes	9	1.42 (1.27, 1.58)	84%, <0.001	0.0222	
No	-	-	-	-	
Smoking status					0.88
Yes	5	1.43 (1.17, 1.75)	88%, <0.001	0.0077	
No	4	1.42 (1.28, 1.58)	68%, 0.02	0.0445	
Alcohol drinking					0.51
Yes	5	1.37 (1.23, 1.53)	80%, <0.001	0.0124	
No	4	1.52 (1.13, 2.04)	90%, <0.001	0.0817	
Physical activity					0.54
Yes	4	1.37 (1.20, 1.56)	85%, <0.001	0.0148	
No	5	1.49 (1.19, 1.86)	86%, <0.001	0.0553	
Family history of diabetes					0.51
Yes	5	1.37 (1.23, 1.53)	80%, <0.001	0.0124	
No	4	1.52 (1.13, 2.04)	90%, <0.001	0.0817	
All abovementioned confounders					0.96
Yes	3	1.43 (1.25, 1.63)	78%, 0.01	0.0106	
No	6	1.42 (1.20, 1.68)	85%, <0.001	0.0362	
Adjustments for intermediates					
Blood glucose					0.67
Yes	6	1.40 (1.22, 1.61)	85%, <0.001	0.0239	
No	3	1.46 (1.16, 1.83)	86%, 0.001	0.0338	
Blood pressure					0.005
Yes	6	1.56 (1.37, 1.77)	74%, <0.001	0.0182	
No	3	1.21 (1.14, 1.29)	0%, 0.80	0.0000	
Blood glucose and blood pressure					0.41
Yes	4	1.53 (1.24, 1.88)	83%, <0.001	0.0357	
No	5	1.35 (1.18, 1.53)	82%, <0.001	0.0170	
Adjustment for all abovementioned confounders and intermediates					0.59
Yes	1	1.47 (1.35, 1.61)	-	-	
No	8	1.41 (1.24, 1.61)	85%, <0.001	0.0274	

[1] p for heterogeneity within each subgroup
[2] p for heterogeneity between subgroups using meta-regression analyses

Table S9. GRADE evidence table for the association of adiposity measures and risk of type 2 diabetes.

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Participants	Cases (event rate)	Relative (95% CI)	Absolute (95% CI)		
Body mass index												
182	observational studies	serious [a]	serious [b]	not serious	not serious	Publication bias very strong association dose response gradient	5,585,850	228,695 (4.09%)	**RR 1.72** (1.65 to 1.81)	**64 more per 1,000** (from 58 more to 72 more)	⊕⊕⊕⊕ High	CRITICAL
Waist circumference												
78	observational studies	serious [c]	serious [d]	not serious	not serious	publication bias strongly suspected very strong association dose response gradient	21,459,955	2,006,648 (9.35%)	**RR 1.61** (1.52 to 1.70)	**54 more per 1,000** (from 46 more to 62 more)	⊕⊕⊕⊕ High	CRITICAL
Hip circumference												
14	observational studies	serious [e]	serious [f]	not serious	serious [g]	dose response gradient	231,410	9623 (4.2%)	**RR 1.11** (0.98 to 1.27)	**10 more per 1,000** (from 2 fewer to 24 more)	⊕⊕◯◯ Low	CRITICAL
Waist-to-hip ratio												

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Participants	Cases (event rate)	Relative (95% CI)	Absolute (95% CI)		
34	observational studies	serious [h]	serious [i]	not serious	not serious	publication bias strongly suspected very strong association dose response gradient	934,589	46,763 (5%)	**RR 1.63** (1.50 to 1.78)	**56 more per 1,000** (from 44 more to 69 more)	⊕⊕⊕⊕ High	CRITICAL
Waist-to-height ratio												
25	observational studies	serious [j]	not serious [k]	not serious	not serious	publication bias strongly suspected strong association dose response gradient	210,053	12,352 (5.9%)	**RR 1.73** (1.51 to 1.98)	**64 more per 1,000** (from 45 more to 87 more)	⊕⊕⊕⊕ High	CRITICAL
Visceral adiposity index												
9	observational studies	serious [l]	serious [m]	not serious	not serious	strong association dose response gradient	75,145	2158 (2.9%)	**RR 1.42** (1.27 to 1.58)	**37 more per 1,000** (from 24 more to 51 more)	⊕⊕⊕⊕ High	CRITICAL
Body fat percentage												
6	observational studies	serious [n]	serious [o]	not serious	not serious	strong association dose response gradient	44,593	2558 (5.7%)	**RR 2.05** (1.41 to 2.98)	**93 more per 1,000** (from 36 more to 175 more)	⊕⊕⊕⊕ High	CRITICAL

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Participants	Cases (event rate)	Relative (95% CI)	Absolute (95% CI)		
Thigh circumference												
2	observational studies	very serious [p]	serious [q]	serious [r]	serious [s]	none	2971	454 (15.3%)	**RR 1.11** (0.86 to 1.42)	**10 more per 1,000** (from 12 fewer to 37 more)	⨁◯◯◯ Very low	CRITICAL
A body shape index												
5	observational studies	serious [t]	serious [u]	not serious	not serious	strong association dose response gradient	481,870	26,364 (5.5%)	**RR 1.09** (1.05 to 1.13)	**8 more per 1,000** (from 4 more to 11 more)	⨁⨁⨁⨁ High	CRITICAL
Body adiposity index												
5	observational studies	serious [v]	serious [w]	not serious	not serious	strong association dose response gradient	60,790	3576 (5.9%)	**RR 2.55** (1.59 to 4.10)	**137 more per 1,000** (from 52 more to 274 more)	⨁⨁⨁⨁ High	CRITICAL

CI: confidence interval; **RR:** relative risk

Explanations

a. Downgraded since 70 studies with low weighting (35%) judged as serious risk of bias based on ROBINS-I was included in the meta-analysis and residual confounding cannot be ruled out.

b. Serious inconsistency since I^2 = 99%, Phet <0.001, that was largely unexplained in pre-specified subgroup and sensitivity analyses. Downgraded.

c. Downgraded since 28 studies with low weighting (34%) judged as serious risk of bias based on ROBINS-I was included in the meta-analysis and residual confounding cannot be ruled out.

d. Serious inconsistency since I^2 = 99%, Phet <0.001, that was largely unexplained in pre-specified subgroup and sensitivity analyses. Downgraded.

e. Downgraded since 4 studies with low weighting (28%) judged as serious risk of bias based on ROBINS-I was included in the meta-analysis and residual confounding cannot be ruled out.

f. Serious inconsistency since I^2 = 98%, Phet <0.001, that was largely unexplained in pre-specified subgroup and sensitivity analyses. Downgraded.

g. Serious imprecision since the 95% confidence intervals includes no effect (RR of 1.00), but fails to exclude important harm (RR of >1.25). Downgraded.

h. Downgraded since 10 studies with low weighting (30%) judged as serious risk of bias based on ROBINS-I was included in the meta-analysis and residual confounding cannot be ruled out.

i. Serious inconsistency since I^2 = 99%, Phet <0.001, that was largely unexplained in pre-specified subgroup and sensitivity analyses. Downgraded.

j. Downgraded since 7 studies with low weighting (30%) judged as serious risk of bias based on ROBINS-I was included in the meta-analysis and residual confounding cannot be ruled out.

k. Serious inconsistency since I^2 = 97%. However, a pre-specified subgroup analysis indicated similar result with the main analysis in studies that excluded those with pre-existing diseases (RR: 1.77, 95%CI: 1.62, 1.93; I^2 = 0%, n = 7). Not downgraded.

l. Downgraded since 2 studies with low weighting (20%) judged as serious risk of bias based on ROBINS-I was included in the meta-analysis and residual confounding cannot be ruled out.

m. Serious inconsistency since I^2 = 84%, Phet <0.001, that was largely unexplained in pre-specified subgroup and sensitivity analyses. Downgraded.

n. Downgraded since 2 studies with low weighting (32%) judged as serious risk of bias based on ROBINS-I was included in the meta-analysis and residual confounding cannot be ruled out.

o. Serious inconsistency since I^2 = 91%, Phet <0.001. Downgraded.

p. Very serious risk of bias since both studies were rated to have serious risk of bias. Downgraded by two levels.

q. Serious inconsistency since I^2 = 85%, Phet <0.001. Downgraded.

r. Serious indirectness since only two small cohort studies in Europe and Asia were included in the analysis. Downgraded.

s. Serious imprecision since the 95% confidence intervals includes no effect (RR of 1.00), but fails to exclude important harm (RR of >1.25). Downgraded.

t. Downgraded since 2 studies with low weighting (34%) judged as serious risk of bias based on ROBINS-I was included in the meta-analysis and residual confounding cannot be ruled out.

u. Serious inconsistency since I^2 = 85%, Phet <0.001. Downgraded.

v. Downgraded since 1 study with low weighting (21%) judged as serious risk of bias based on ROBINS-I was included in the meta-analysis and residual confounding cannot be ruled out.

w. Serious inconsistency since I^2 = 98%, Phet <0.001. Downgraded.

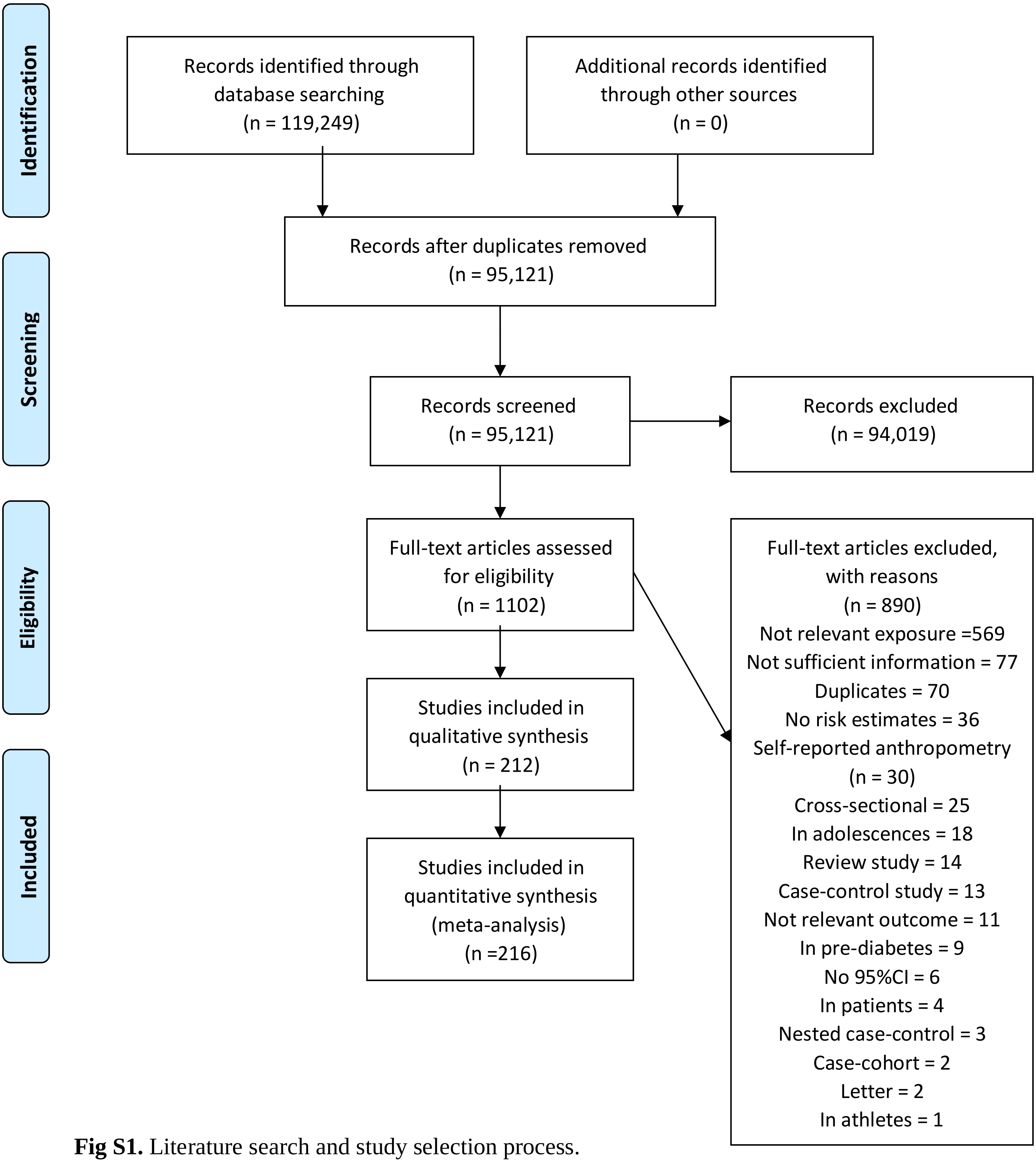

Fig S1. Literature search and study selection process.

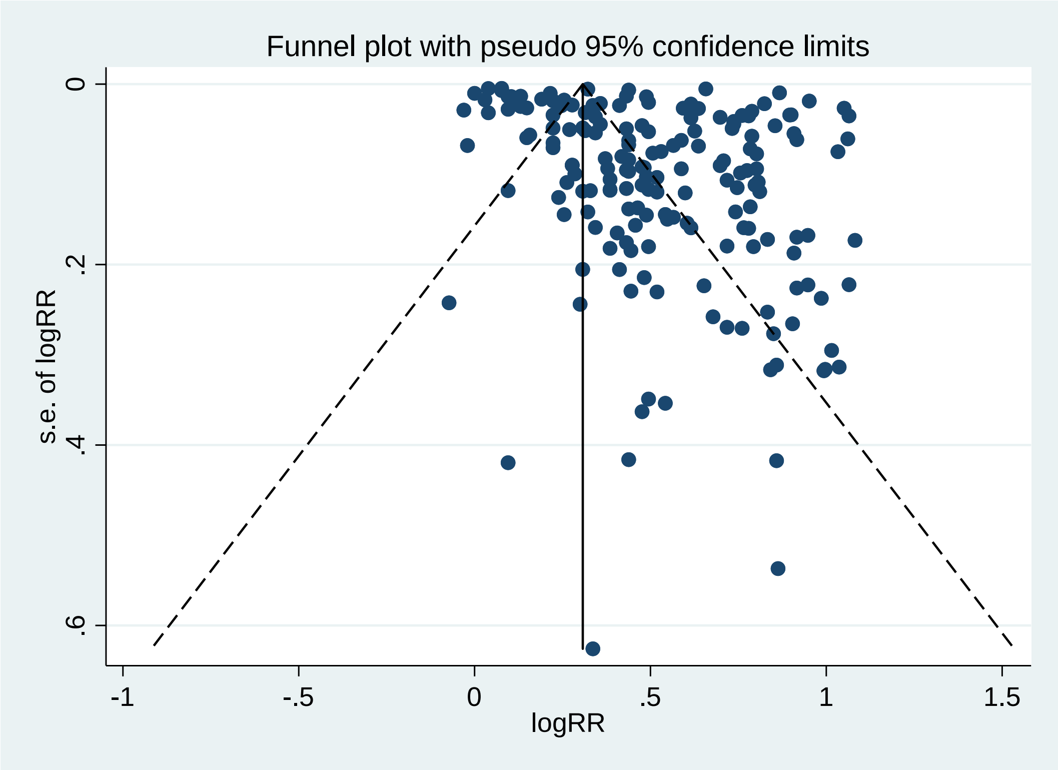

Figure S2. Funnel plot of the relative risks of 182 studies on body mass index (5 unit) and the risk of type 2 diabetes. Begg's test *P*=0.21, Egger's test *P*=0.01. Log RR: natural logarithm of relative risk. s.e: standard error.

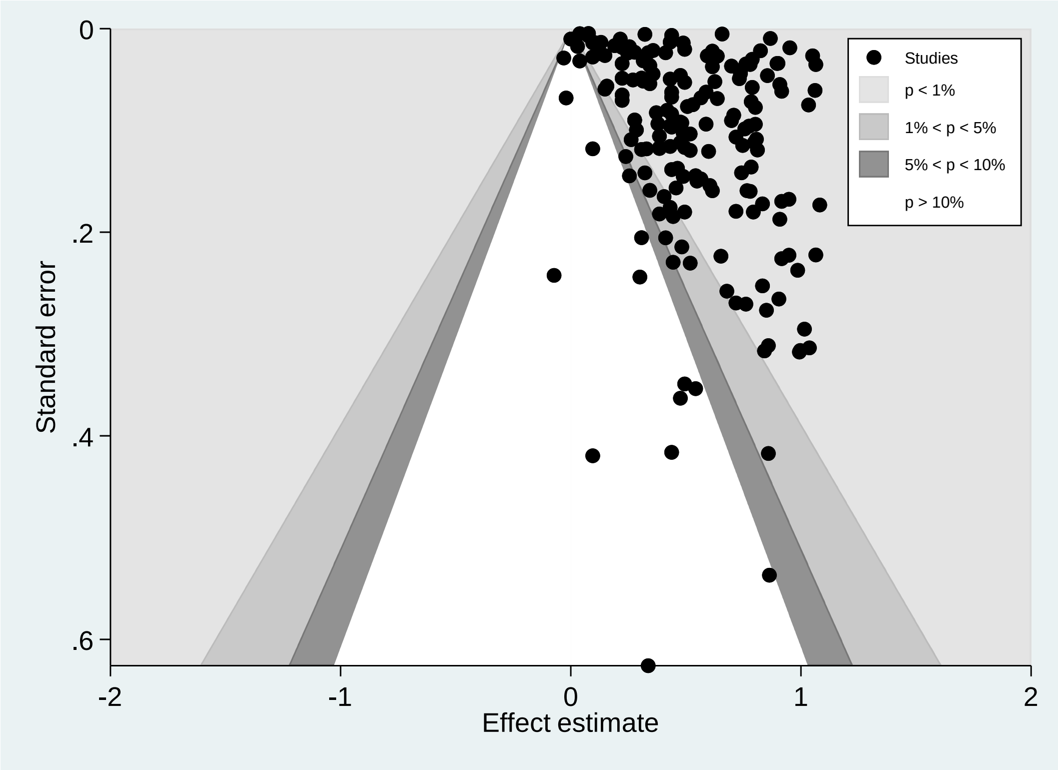

Figure S3. Contour-enhanced funnel plot of the relative risks of 182 studies on body mass index (5 unit) and the risk of type 2 diabetes.

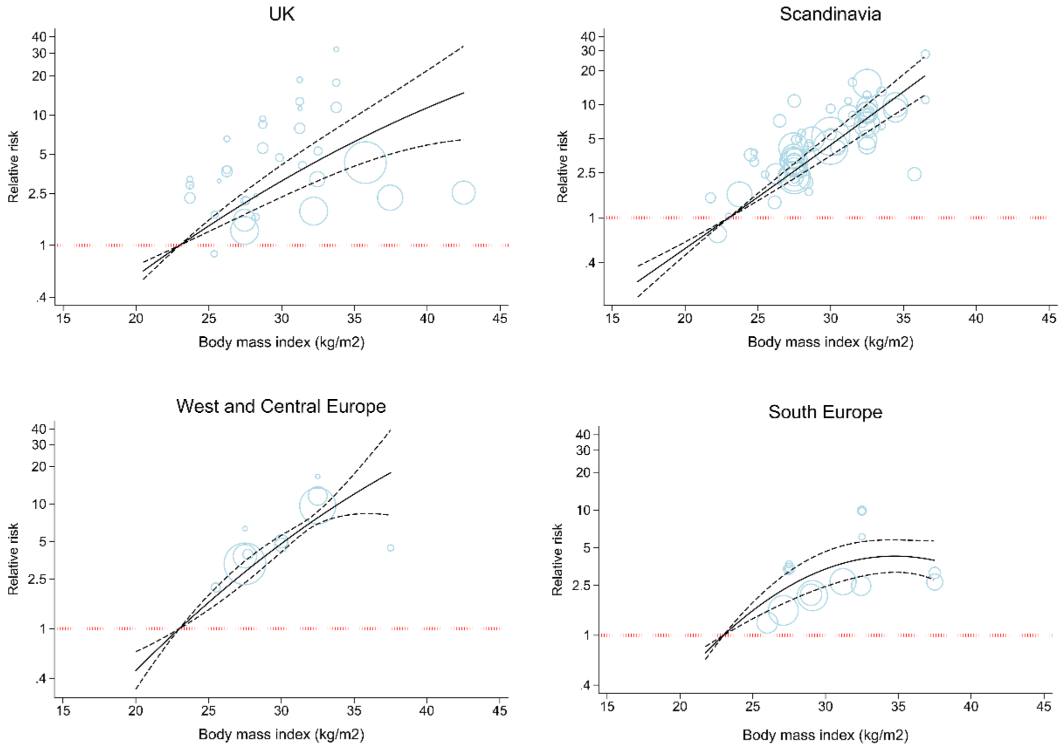

Fig S4. Dose-response association of body mass index and risk of type 2 diabetes in UK ($P_{non-linearity}$ = 0.01, $P_{dose-response}$ = 0.24; n = 7), Scandinavia ($P_{non-linearity}$ = 0.76, $P_{dose-response}$ <0.001; n = 20), West and Central Europe ($P_{non-linearity}$ = 0.48, $P_{dose-response}$ <0.001; n = 6), and South Europe ($P_{non-linearity}$ <0.001, $P_{dose-response}$ <0.001; n = 6). The solid line represents the non-linear dose response and the dotted lines represent the 95% confidence interval. The circles represent the relative risk point estimates for adiposity categories from each study with the size of the circle proportional to the inverse of the standard error.

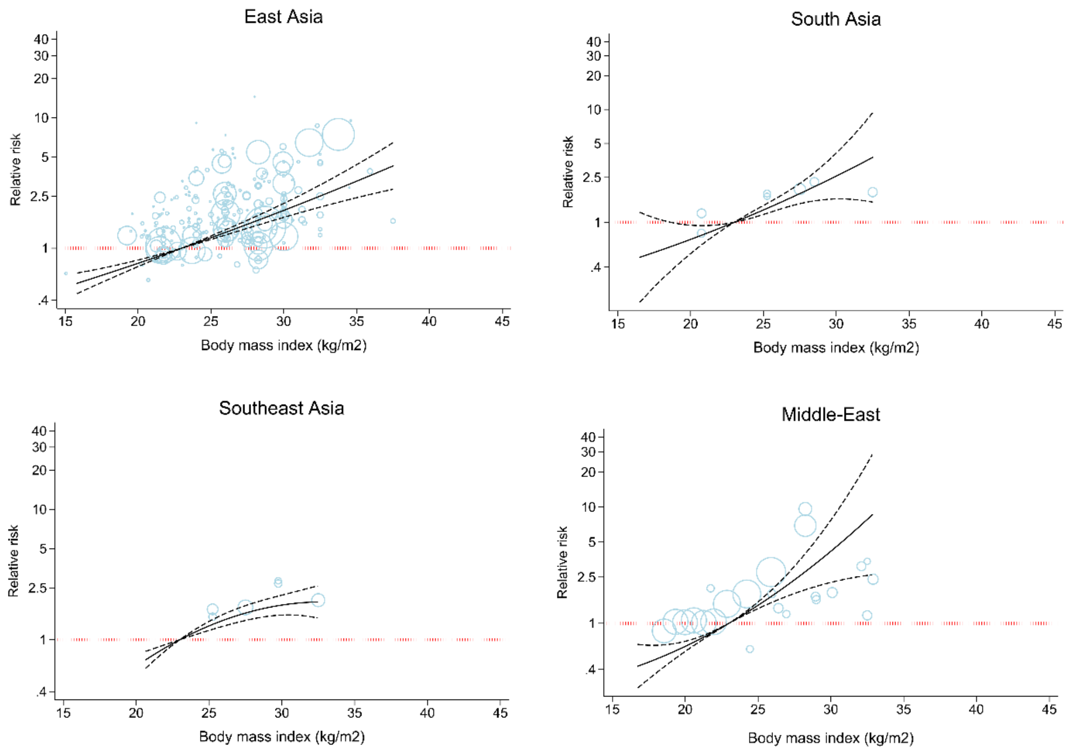

Fig S5. Dose-response association of body mass index with the risk of type 2 diabetes in East Asia ($P_{\text{non-linearity}}$ = 0.53, $P_{\text{dose-response}}$ <0.001; n = 49), South Asia ($P_{\text{non-linearity}}$ = 0.80, $P_{\text{dose-response}}$ <0.001; n = 3), Southeast Asia ($P_{\text{non-linearity}}$ = 0.95, $P_{\text{dose-response}}$ = 0.03; n = 3), and Middle East ($P_{\text{non-linearity}}$ = 0.11, $P_{\text{dose-response}}$ <0.001; n = 6). The solid line represents the non-linear dose response and the dotted lines represent the 95% confidence interval. The circles represent the relative risk point estimates for adiposity categories from each study with the size of the circle proportional to the inverse of the standard error.

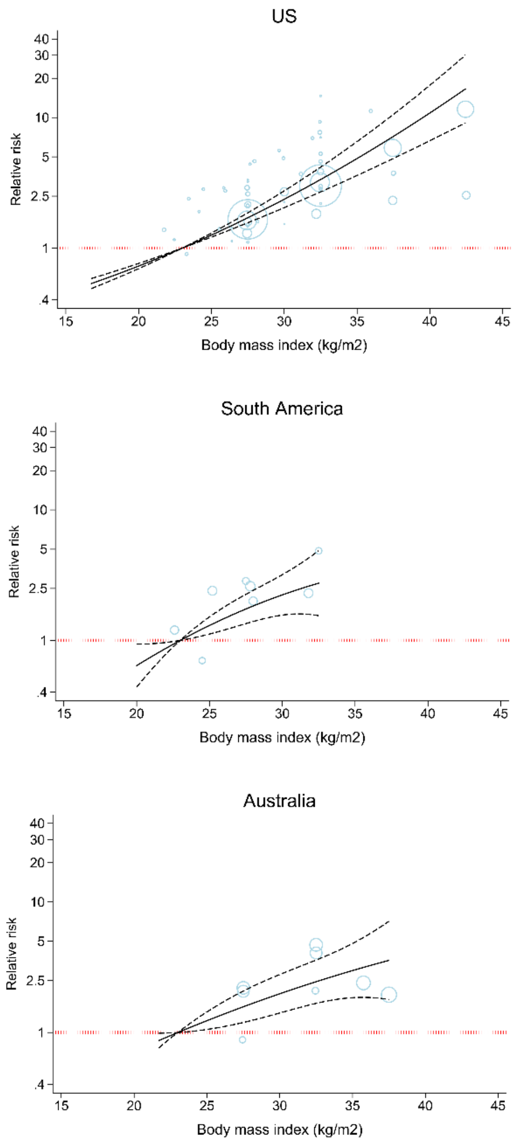

Fig S6. Dose-response association of body mass index with the risk of type 2 diabetes in in the North America ($P_{non-linearity}$ <0.001, $P_{dose-response}$ <0.001; n = 14), South America ($P_{non-linearity}$ = 0.58, $P_{dose-response}$ <0.001; n = 2), and Australia ($P_{non-linearity}$ = 0.73, $P_{dose-response}$ <0.001; n = 5) The solid line represents the non-linear dose response and the dotted lines represent the 95% confidence interval. The circles represent the relative risk point estimates for adiposity categories from each study with the size of the circle proportional to the inverse of the standard error.

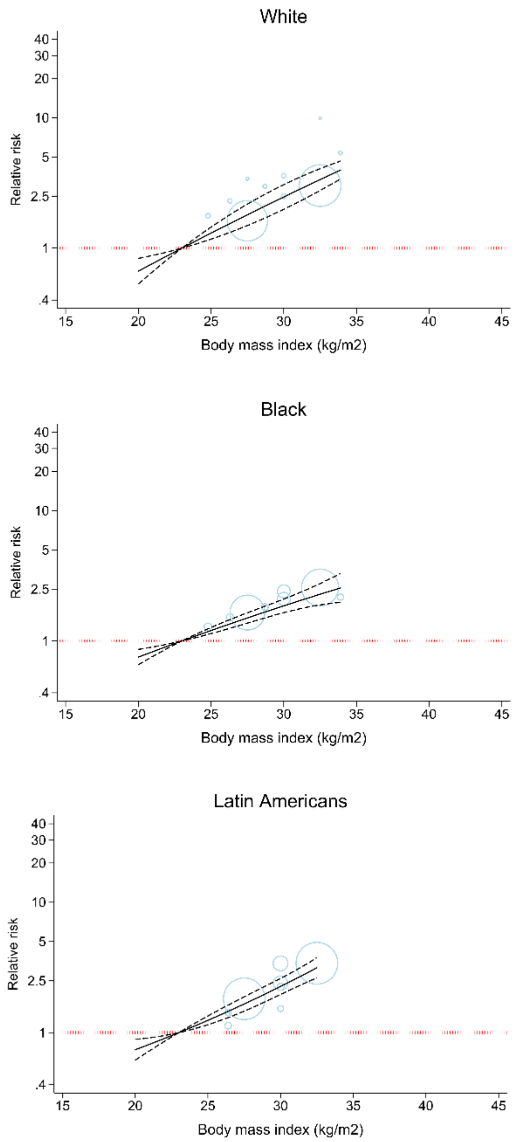

Fig S7. Dose-response association of body mass index with the risk of type 2 diabetes in White ($P_{non-linearity}$ = 0.77, $P_{dose-response}$ <0.001; n = 4), Black ($P_{non-linearity}$ = 0.72, $P_{dose-response}$ <0.001; n = 4), and Latin individuals ($P_{non-linearity}$ = 0.53, $P_{dose-response}$ <0.001; n = 3). The solid line represents the non-linear dose response and the dotted lines represent the 95% confidence interval. The circles represent the relative risk point estimates for adiposity categories from each study with the size of the circle proportional to the inverse of the standard error.

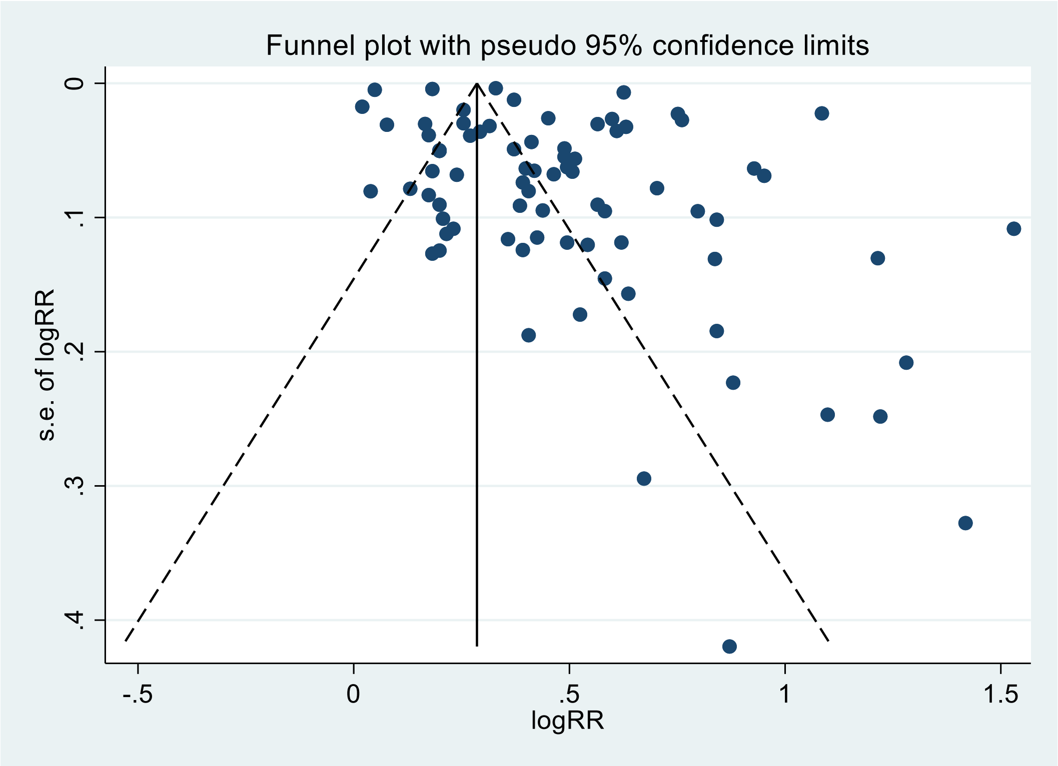

Figure S8. Funnel plot of the relative risks of 78 studies on waist circumference (10 cm) and the risk of type 2 diabetes. Begg's test *P*=0.18, Egger's test *P*=0.01. Log RR: natural logarithm of relative risk. s.e: standard error.

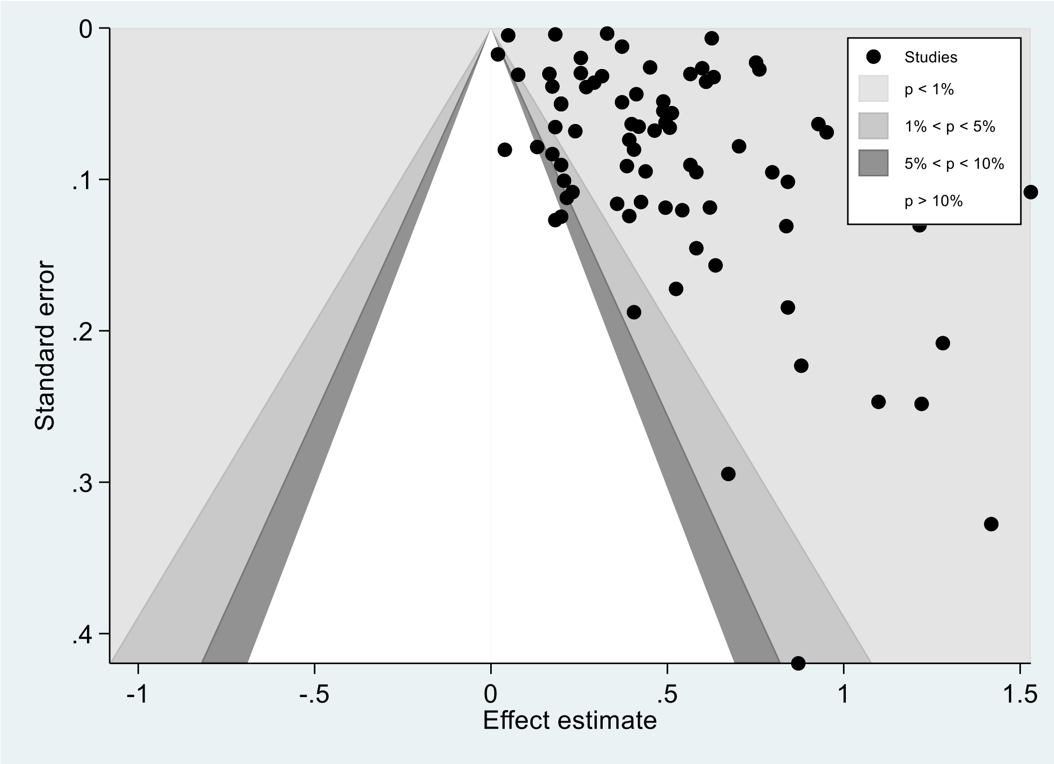

Figure S9. Contour-enhanced Funnel plot of the relative risks of 78 studies on waist circumference (10 cm) and the risk of type 2 diabetes.

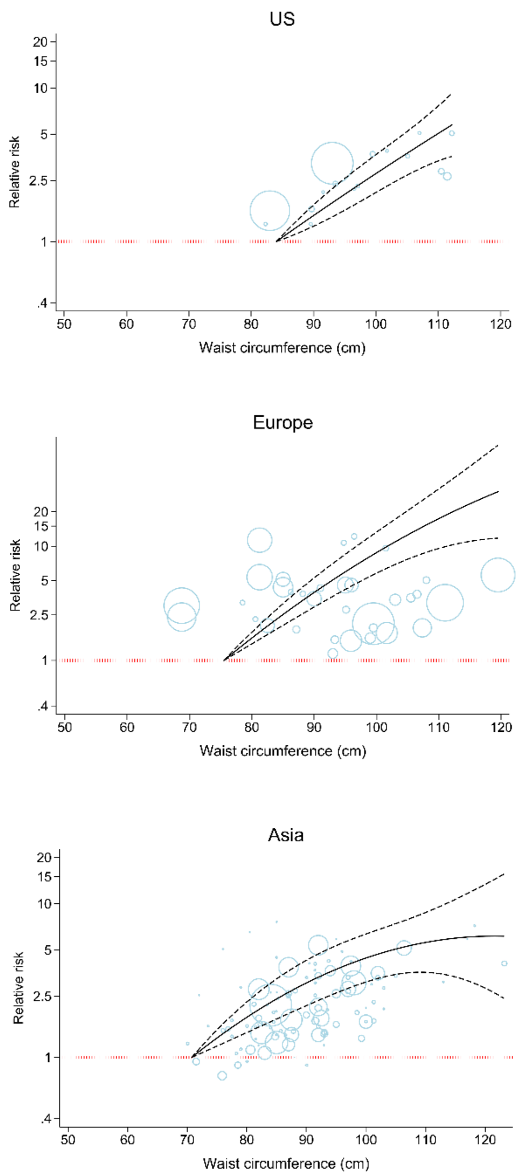

Fig S10. Dose-response association of waist circumference with the risk of type 2 diabetes in the US ($P_{non-linearity}$ = 0.83; n = 4), Europe ($P_{non-linearity}$ = 0.18; n = 10), and Asian countries ($P_{non-linearity}$ = 0.28; n = 28). The solid line represents the non-linear dose response and the dotted lines represent the 95% confidence interval. The circles represent the relative risk point estimates for adiposity categories from each study with the size of the circle proportional to the inverse of the standard error.

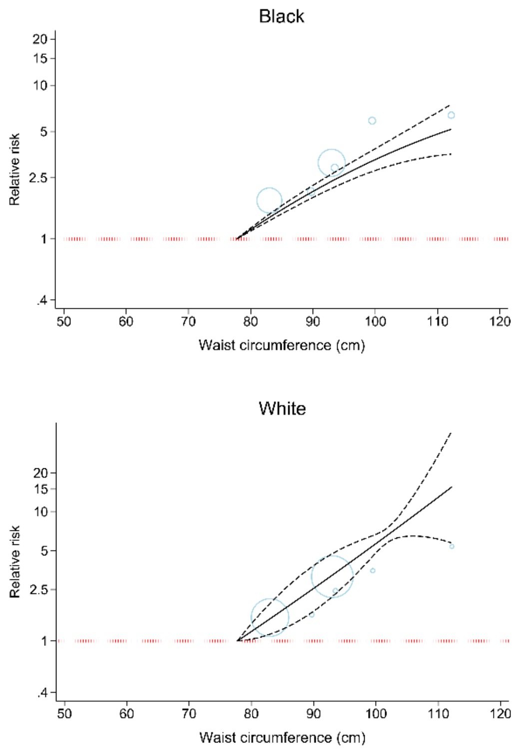

Fig S11. Dose-response association of waist circumference with the risk of type 2 diabetes in Black ($P_{non\text{-}linearity}$ = 0.32; n = 2) and White individuals ($P_{non\text{-}linearity}$ = 0.92; n = 2). The solid line represents the non-linear dose response and the dotted lines represent the 95% confidence interval. The circles represent the relative risk point estimates for adiposity categories from each study with the size of the circle proportional to the inverse of the standard error.

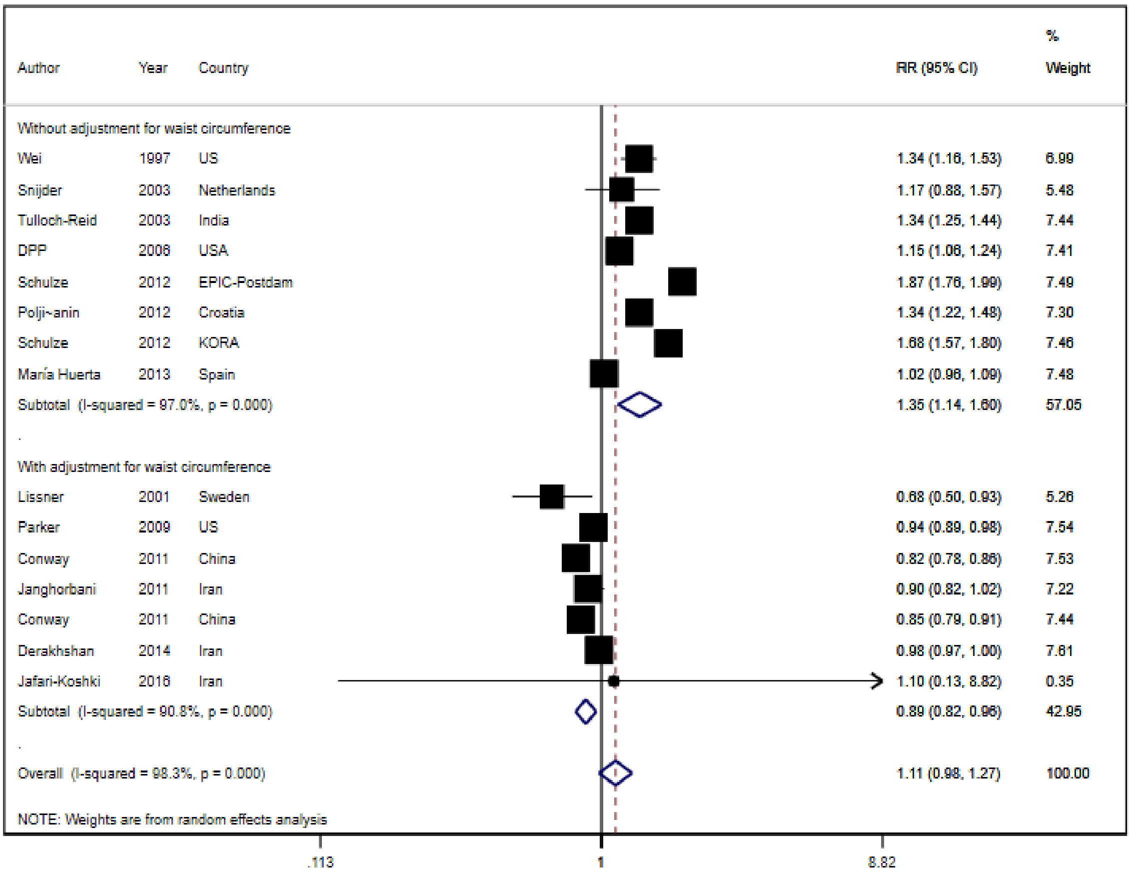

Fig S12. Relative risk of type 2 diabetes for a 10 cm higher hip circumference. RR; relative risk.

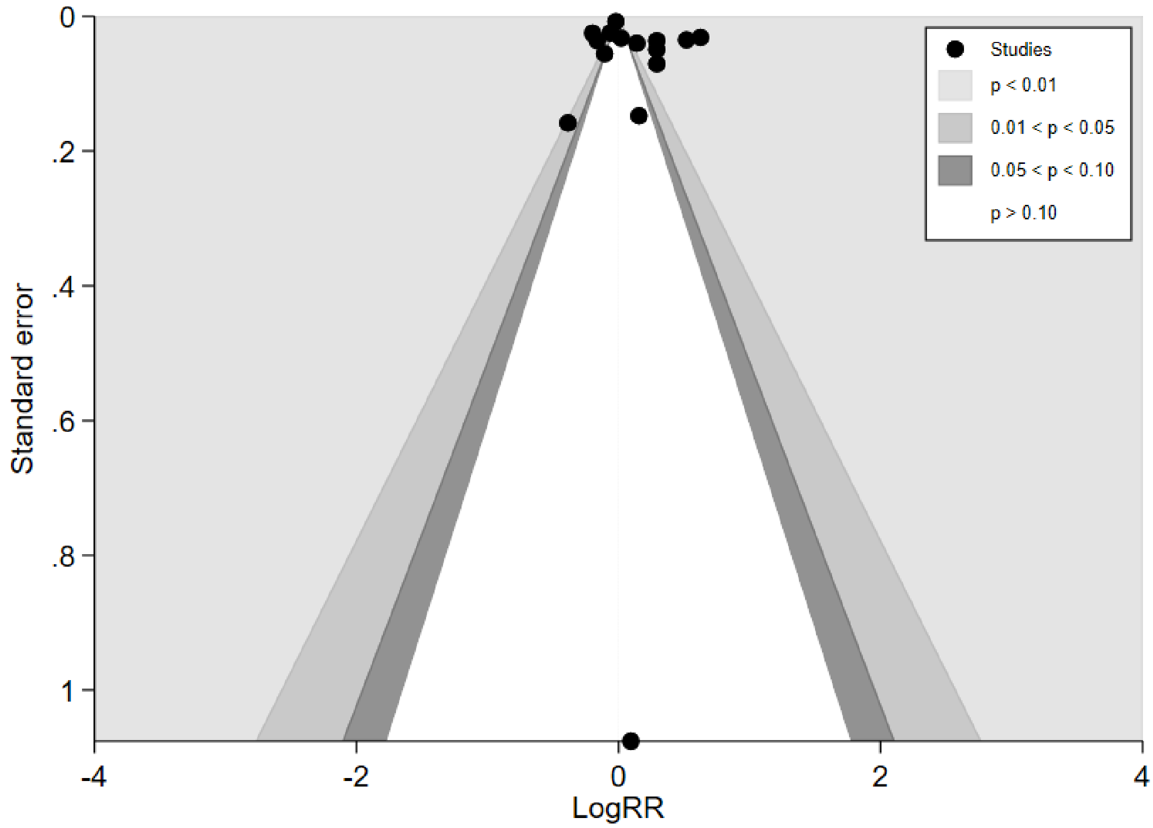

Figure S13. Funnel plot of the relative risks of 14 studies on hip circumference (10 cm) and the risk of type 2 diabetes. Begg's test *P*=0.68, Egger's test *P*=0.24. Log RR: natural logarithm of relative risk. s.e: standard error.

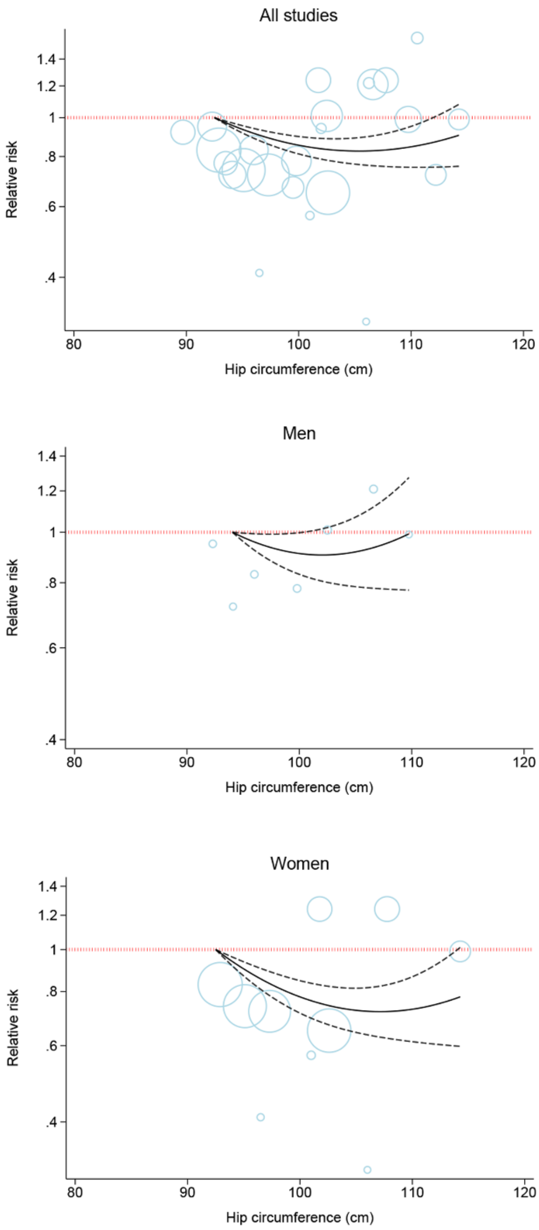

Fig S14. Dose-response association of hip circumference with the risk of type 2 diabetes in all individuals ($P_{non\text{-}linearity}$ <0.001; n = 3), men ($P_{non\text{-}linearity}$ <0.001; n = 2), and women ($P_{non\text{-}linearity}$ <0.001; n = 2). The solid line represents the non-linear dose response and the dotted lines represent the 95% confidence interval. The circles represent the relative risk point estimates for adiposity categories from each study with the size of the circle proportional to the inverse of the standard error.

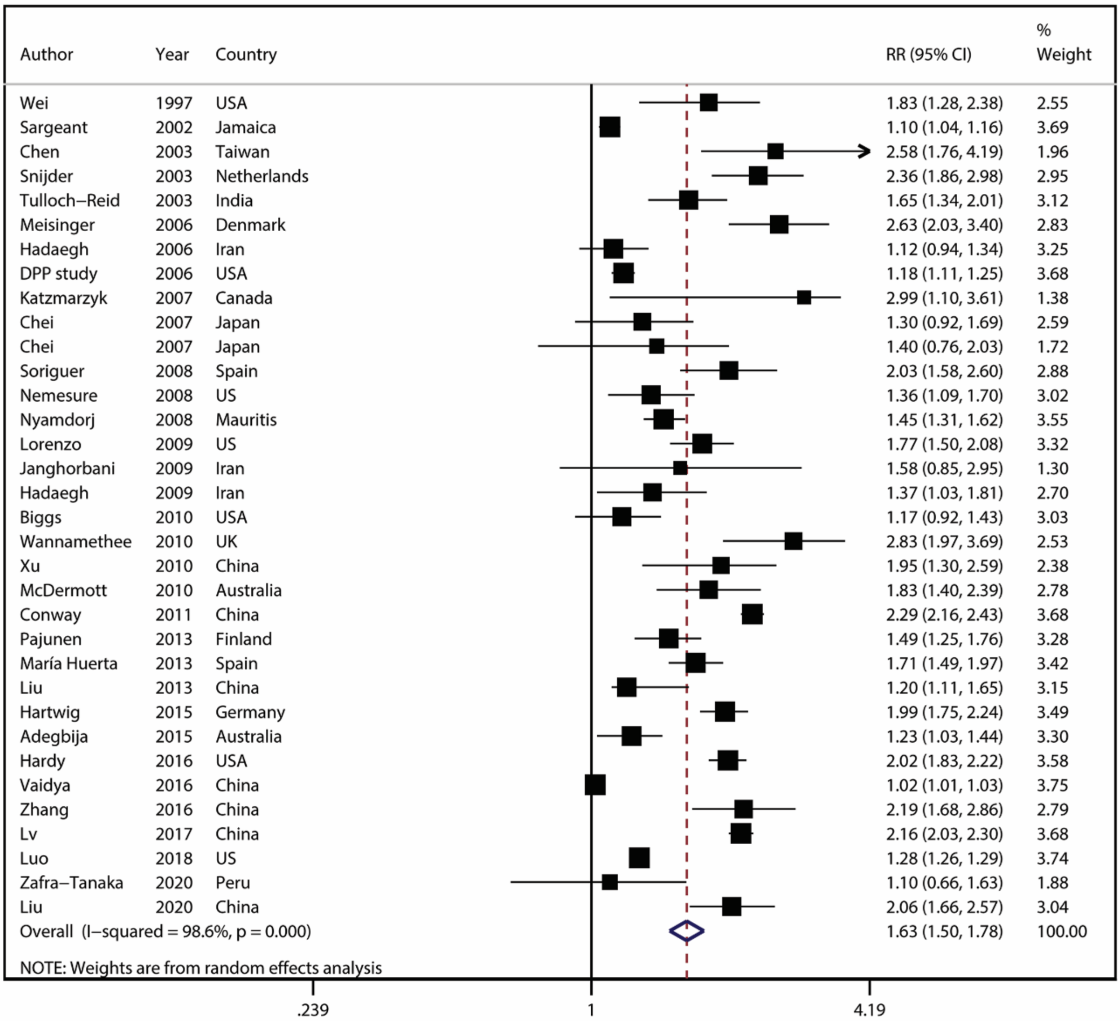

Fig S15. Relative risk of type 2 diabetes for a 0.1 unit higher waist-to-hip ratio. RR, relative risk.

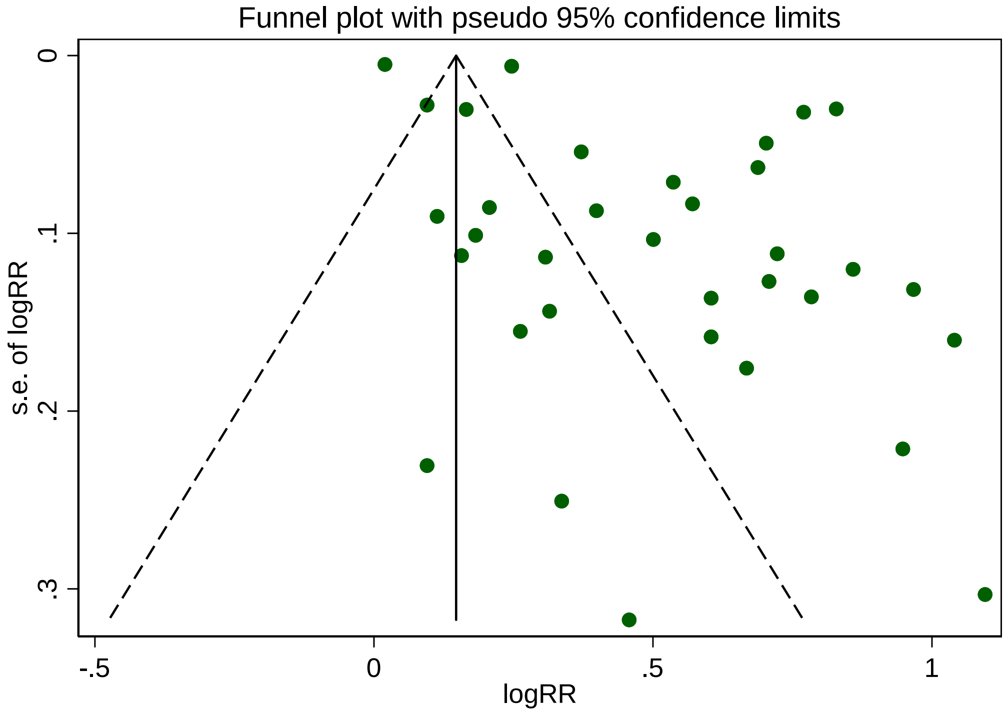

Figure S16. Funnel plot of the relative risks of 34 studies on waist-to-hip ratio (0.1 unit) and the risk of type 2 diabetes. Begg's test *P*=0.21, Egger's test *P*=0.02. Log RR: natural logarithm of relative risk. s.e: standard error.

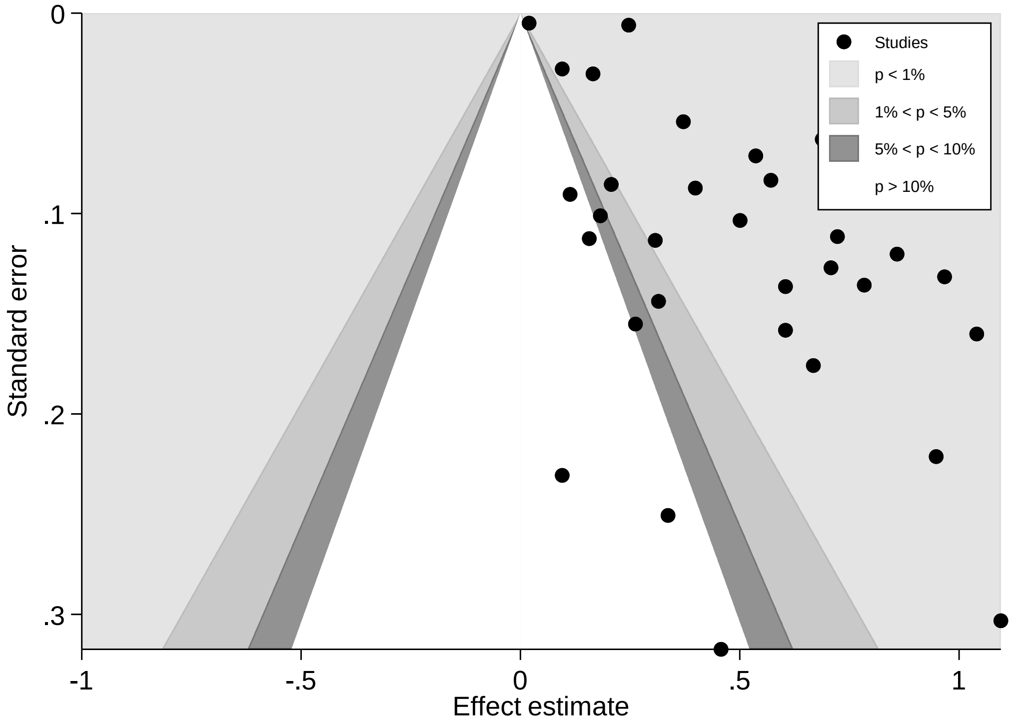

Figure S17. Contour-enhanced funnel plot of the relative risks of 34 studies on waist-to-hip ratio (0.1 unit) and the risk of type 2 diabetes.

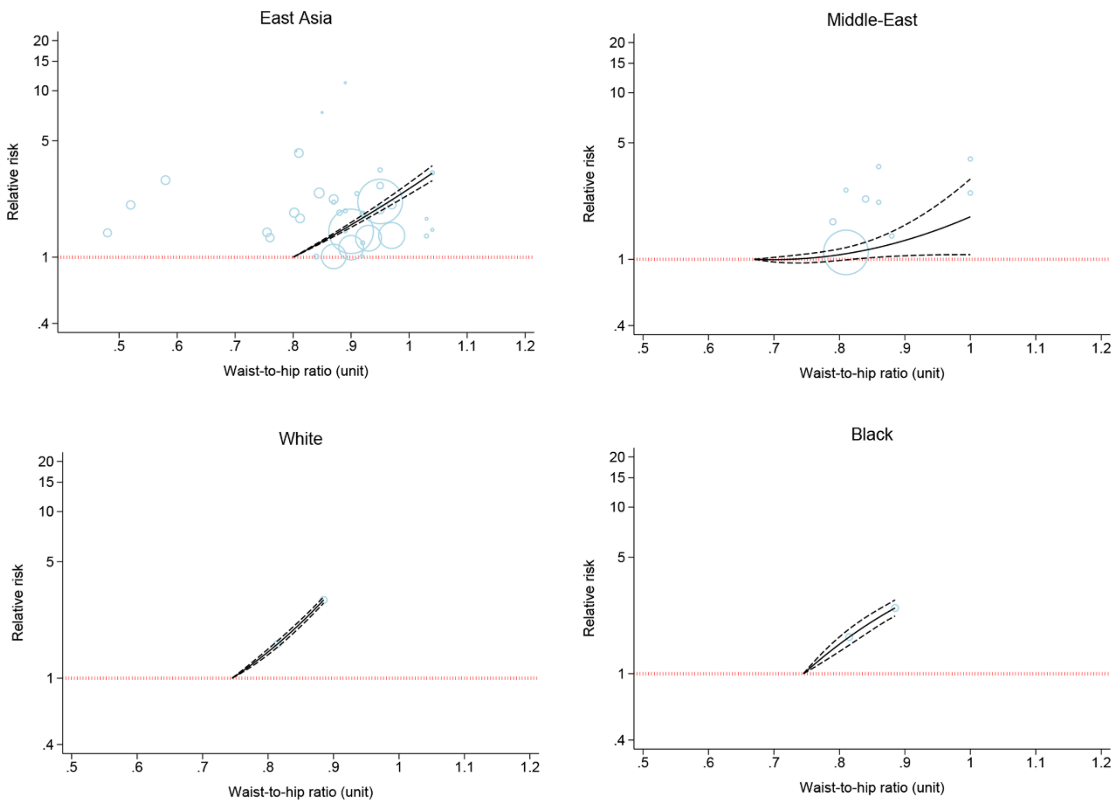

Fig S18. Dose-response association of waist-to-hip ratio with the risk of type 2 diabetes in the Middle East ($P_{non\text{-}linearity}$ = 0.11, $P_{dose\text{-}response}$ <0.001; n = 3), East Asia ($P_{non\text{-}linearity}$ = 0.84, $P_{dose\text{-}response}$ <0.001; n = 7), White ($P_{non\text{-}linearity}$ = 0.61, $P_{dose\text{-}response}$ <0.001; n = 1) and Black individuals ($P_{non\text{-}linearity}$ = 0.24, $P_{dose\text{-}response}$ <0.001; n = 1). The solid line represents the non-linear dose response and the dotted lines represent the 95% confidence interval. The circles represent the relative risk point estimates for adiposity categories from each study with the size of the circle proportional to the inverse of the standard error.

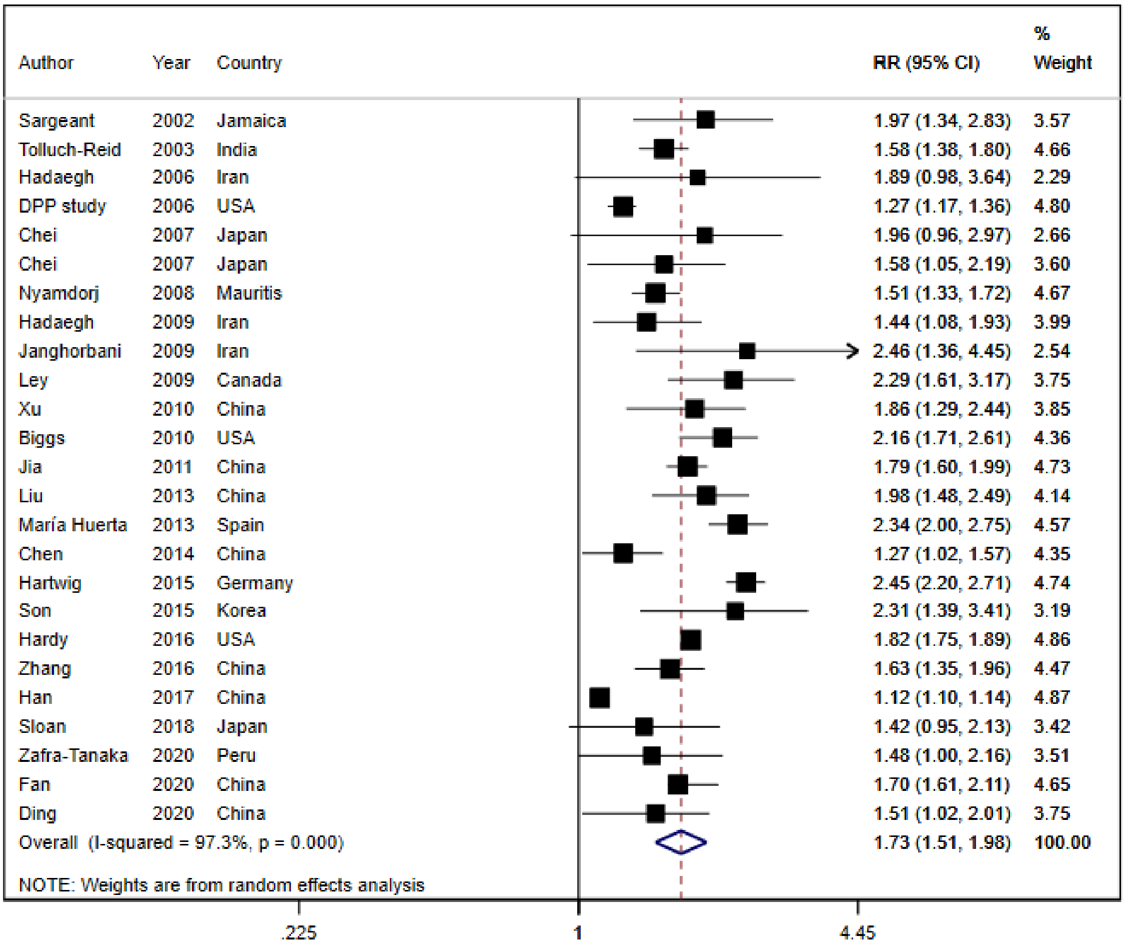

Fig S19. Relative risk of type 2 diabetes for a 0.1 unit higher waist-to-height ratio. RR, relative risk.

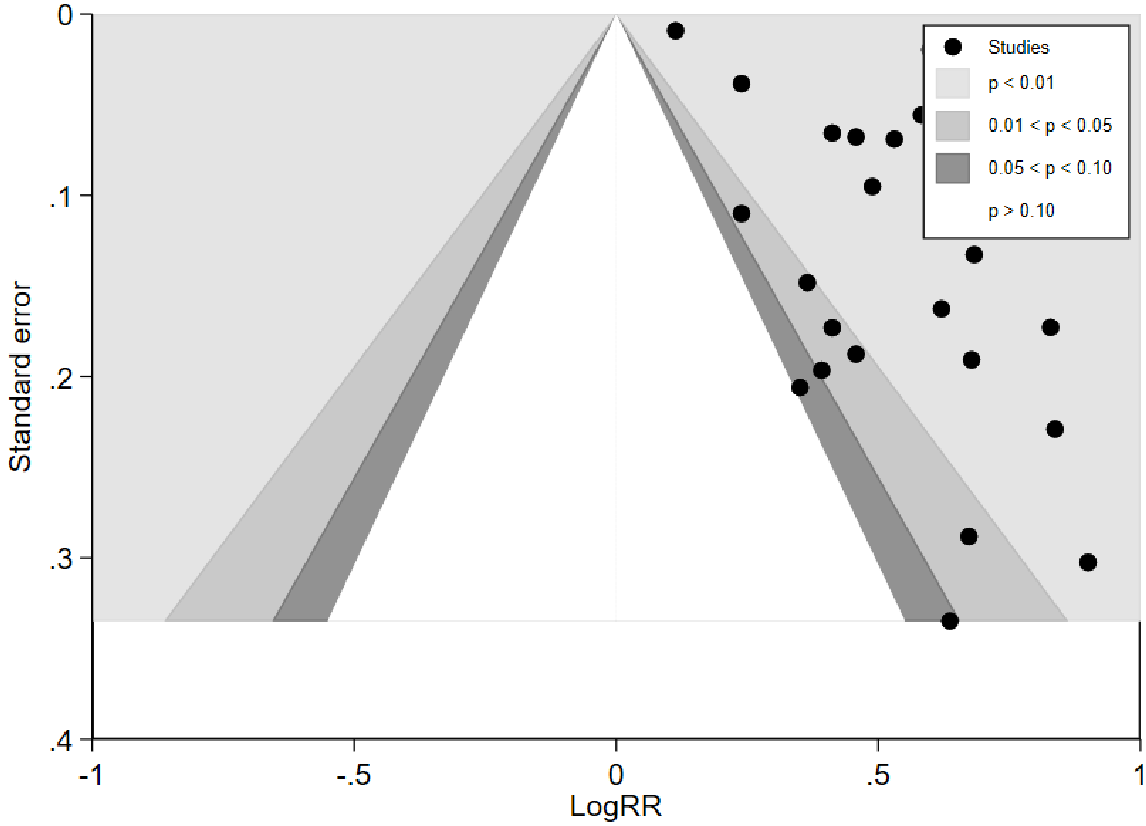

Figure S20. Funnel plot of the relative risks of 25 studies on waist-to-height ratio (0.1 unit) and the risk of type 2 diabetes. Begg's test *P*=0.08, Egger's test *P*=0.01. Log RR: natural logarithm of relative risk. s.e: standard error.

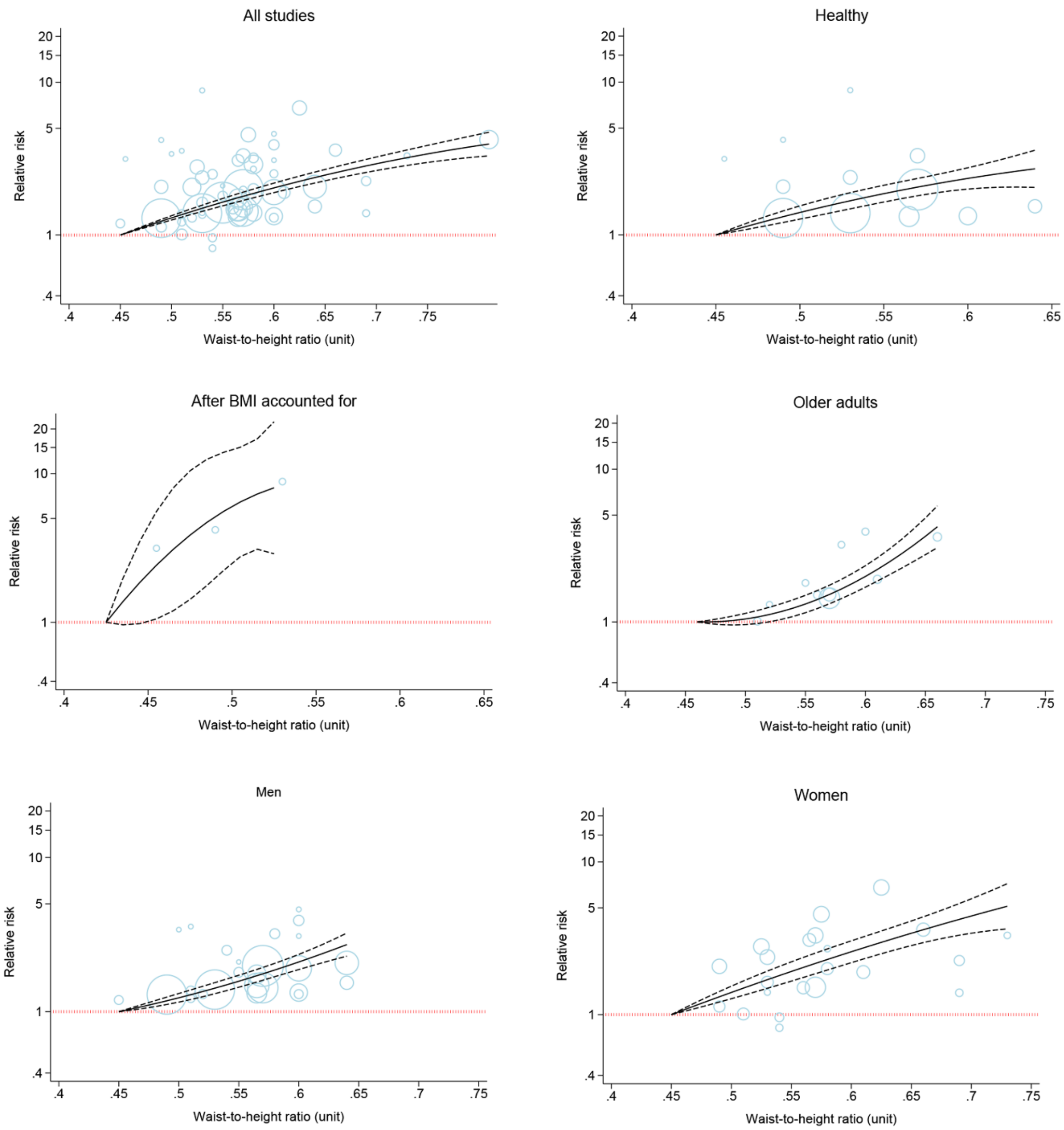

Fig S21. Dose-response association of waist-to-height ratio with the risk of type 2 diabetes in the main analysis ($P_{non\text{-}linearity}$ <0.001, $P_{dose\text{-}response}$ <0.001; n = 14), healthy individuals ($P_{non\text{-}linearity}$ = 0.29; n = 3), after body mass index accounted for ($P_{non\text{-}linearity}$ = 0.57; n = 1), older adults ($P_{non\text{-}linearity}$ <0.001; n = 2), men ($P_{non\text{-}linearity}$ = 0.24; n = 8) and women ($P_{non\text{-}linearity}$ = 0.56; n = 7). The solid line represents the non-linear dose response and the dotted lines represent the 95% confidence interval. The circles represent the relative risk point estimates for adiposity categories from each study with the size of the circle proportional to the inverse of the standard error.

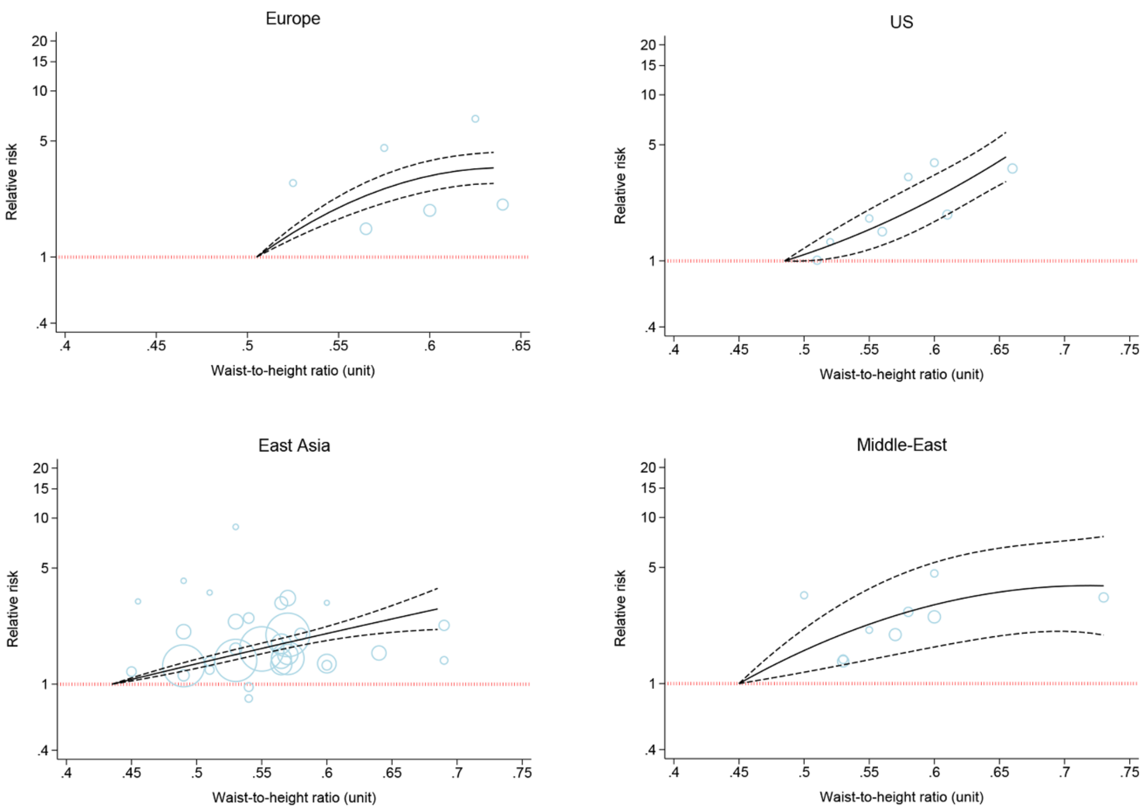

Fig S22. Dose-response association of waist-to-height ratio with the risk of type 2 diabetes in the US ($P_{non-linearity}$ = 0.08, n = 1), Europe ($P_{non-linearity}$ <0.001, n = 1), Middle East ($P_{non-linearity}$ = 0.13, n = 3), and East Asia ($P_{non-linearity}$ = 0.20, n = 10). The solid line represents the non-linear dose response and the dotted lines represent the 95% confidence interval. The circles represent the relative risk point estimates for adiposity categories from each study with the size of the circle proportional to the inverse of the standard error.

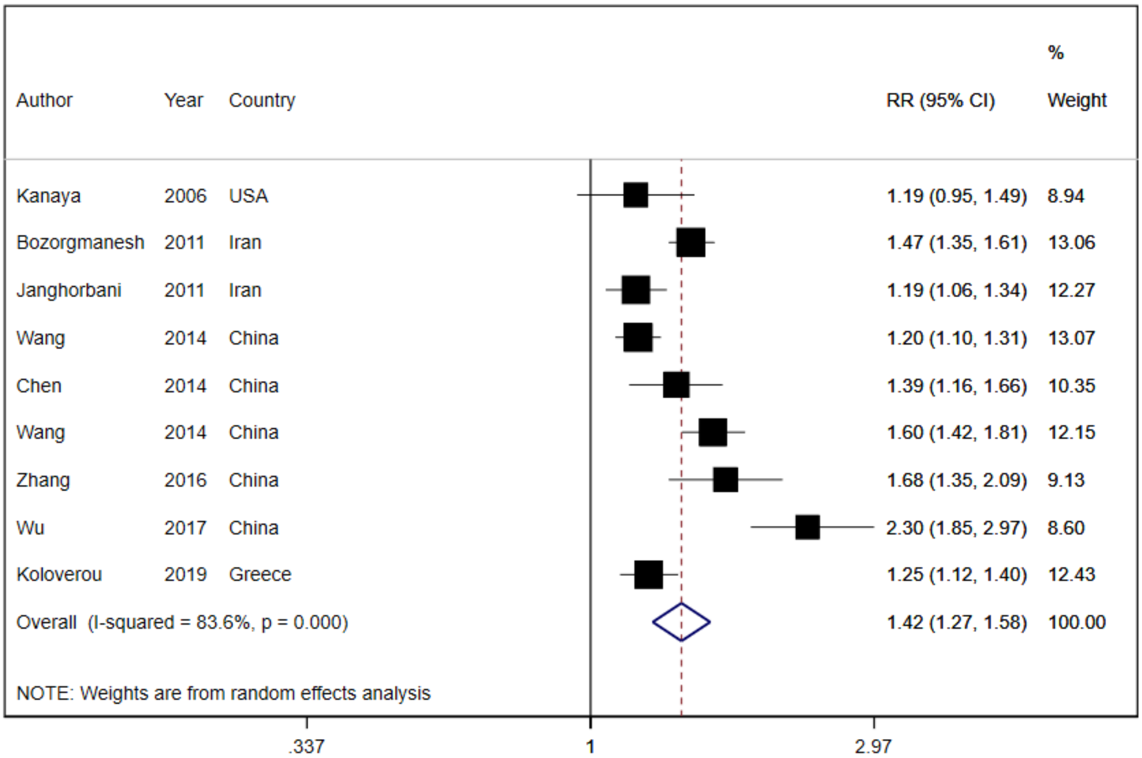

Fig S23. Relative risk of type 2 diabetes for a 1 unit higher visceral adiposity index. RR, relative risk.

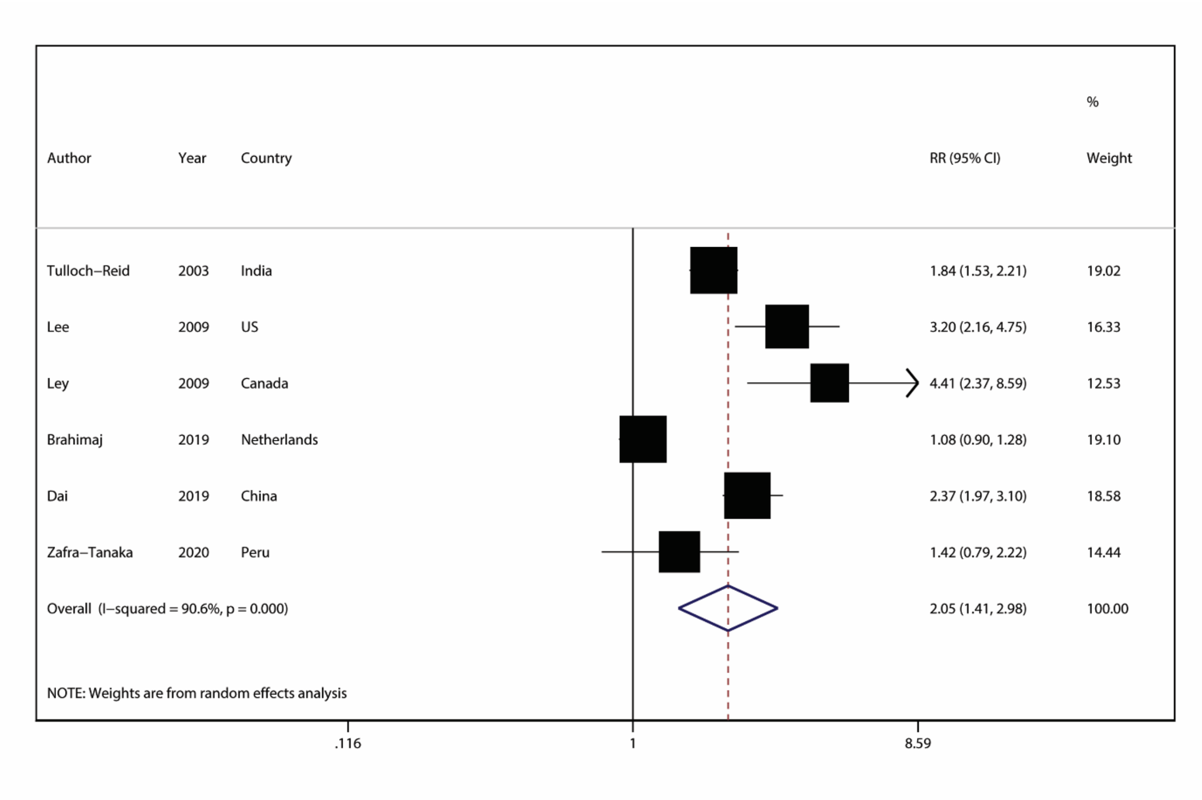

Fig S24. Relative risk of type 2 diabetes for a 10% higher body fat percentage. RR, relative risk.

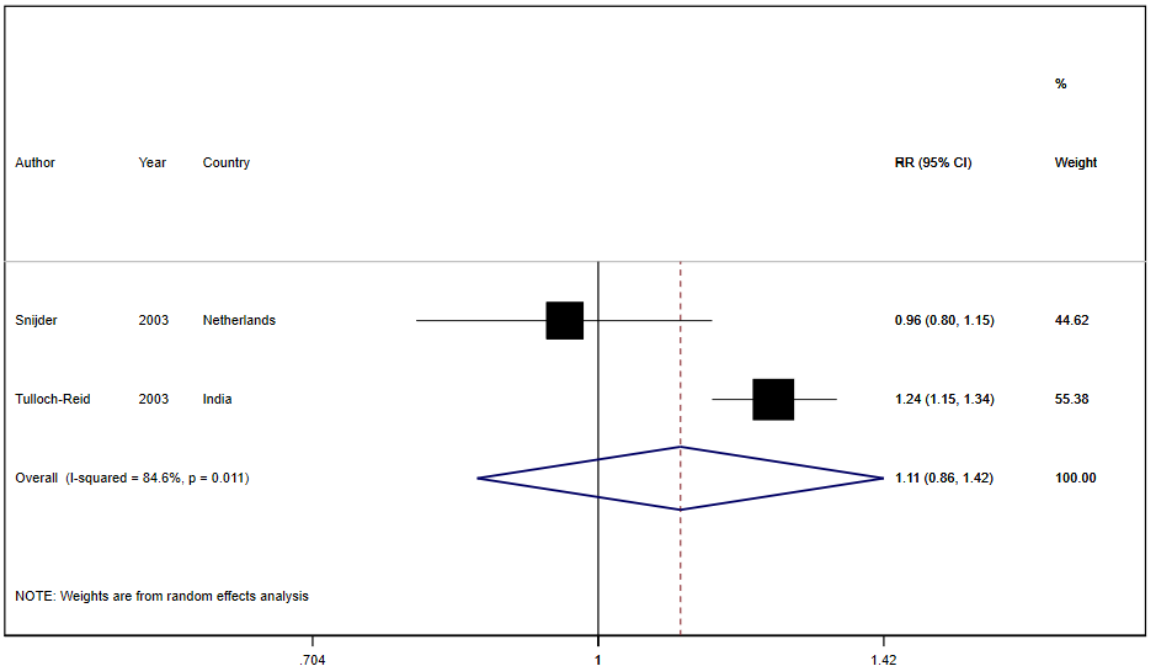

Fig S25. Relative risk of type 2 diabetes for a 5 cm larger thigh circumference and type 2 diabetes. RR, relative risk.

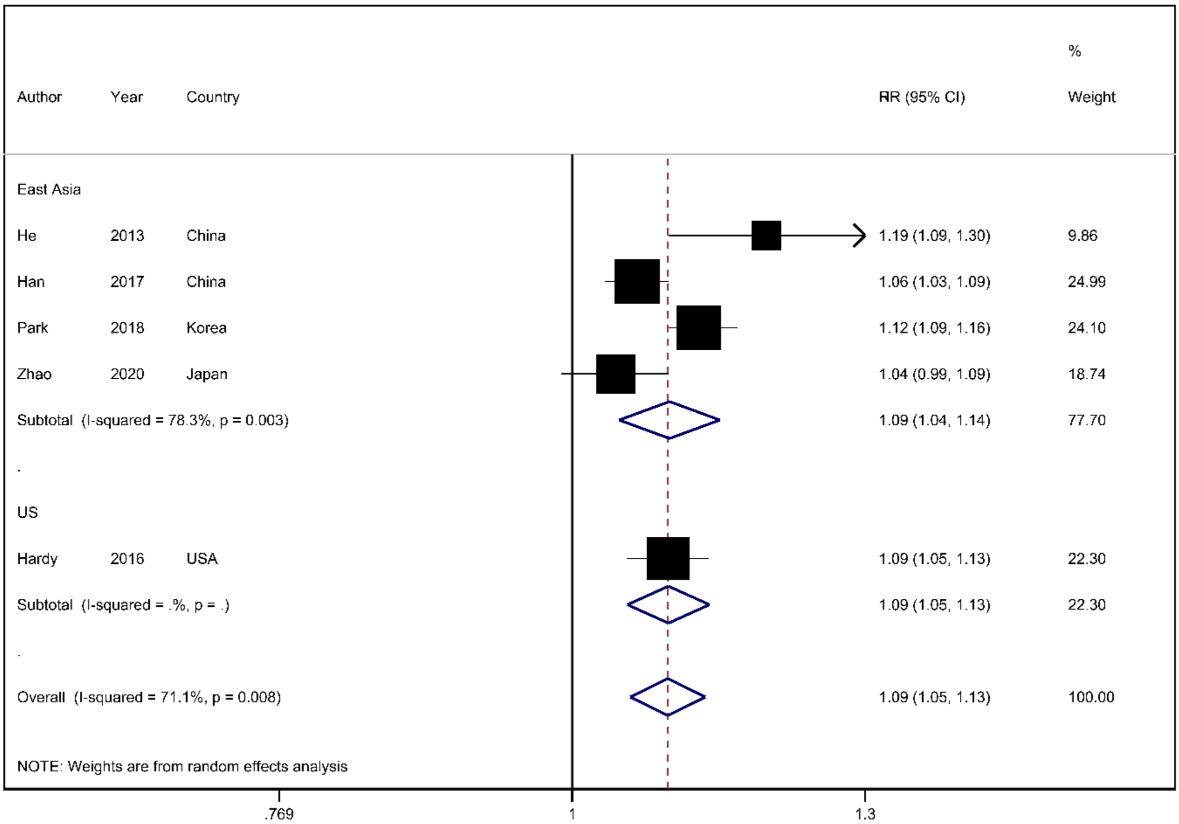

Fig S26. Relative risk of type 2 diabetes for a 0.005 unit higher A body shape index. RR, relative risk.

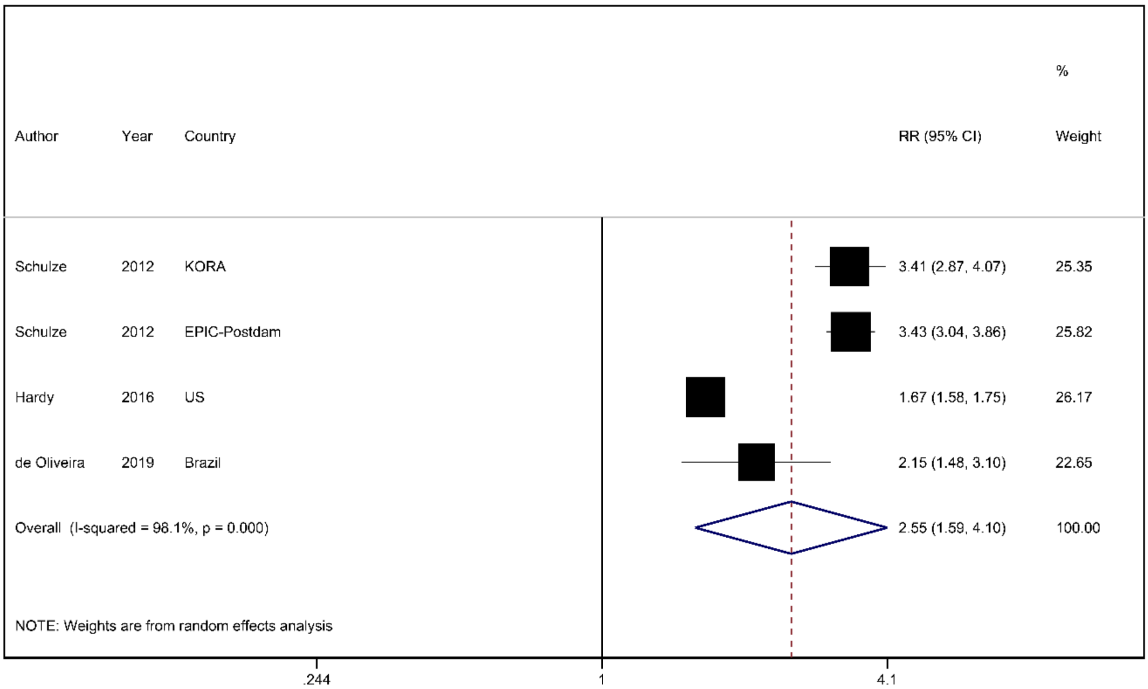

Fig S27. Relative risk of type 2 diabetes for a 10% higher body adiposity index. RR, relative risk.

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