

Supplementary Materials

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Supplementary Table 1. Definitions and healthy levels of each lifestyle factor

Lifestyle factors	Definition
Smoking status	Smoking status was categorized as current, former, never smoker; never smoking was considered as a healthy level.
Alcohol consumption	Alcohol consumption was categorized as never, low-risk (≤ 7 standard drinks/week; 1 drink = 14 g ethanol) and high-risk (> 7 drinks/week or daily). Never drinkers served as the healthy reference group.
Physical activity	A healthy level of physical activity is defined as ≥ 150 min/week moderate intensity or ≥ 75 min/week vigorous intensity.
Diet	A healthy diet level was defined as meeting at least six of the following recommendations
	1. Fruits: ≥ 3 servings/day
	2. Vegetables: ≥ 3 servings/day
	3. Whole grains: ≥ 3 servings/day
	4. Refined grains: ≤ 2 servings/day
	5. Fish: ≥ 2 times/week
	6. Processed meat: ≤ 1 servings/week
	7. Unprocessed meat: ≤ 2 servings/week
	Serving size definitions:
	Fruits: 1 serving = 1 piece of fresh fruit or 5 pieces of dried fruit
Sleep	Vegetables: 1 serving = 3 tablespoons of salad or raw/cooked vegetables
	Whole grains: 1 serving = 1 slice of wholemeal/wholegrain bread or 1 bowl of bran, oat, or muesli cereal
	Refined grains: 1 serving = 1 slice of white, brown, or other bread or 1 bowl of biscuit cereal or other cereal
	Fish: 1 serving = 1 occasion of oily or non-oily fish per week
	Processed meat: 1 serving = 1 occasion of consumption per week
	Unprocessed red meat: 1 serving = 1 occasion of consuming beef, lamb/mutton, or pork per week
Sleep	A healthy sleep level was defined as 7-8 hours per day.

Body mass index	A body mass index of < 25kg/m ² was considered a healthy level.
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Supplementary Table 2. Field ID for exposure and covariates

Variables	Field ID
Diet quality	1309, 1319, 1289, 1299, 1329, 1339, 1359, 1369, 1379, 1389, 1438, 1448, 1349, 1458, 1468
Physical activity	884, 894, 904, 914
Smoking status	20116, 1239, 1249, 2644
Alcohol consumption	1558, 1578, 1588
Sleep duration	1160
Body mass index	21001
Polygenic risk score	26285
Age	21022
Race/ethnicity	21000
Education level	6138
Parity	2734
Oral contraceptive use	2784, 2794
Family history of diabetes	20107, 20110, 20111
Townsend deprivation index	22189
Menopausal status	2714
Social support	709 2110 6160
Medication use	6153

Supplementary Table 3. ICD-9 and ICD-10 codes for gestational diabetes mellitus, hypertensive disorders of pregnancy, and type 2 diabetes mellitus.

Disease	ICD-9	ICD-10
Gestational diabetes mellitus	648.0, 648.8	O24.4
Hypertensive disorders of pregnancy	642.3, 642.4, 642.5, 642.6, 642.7	O11, O13, O14.0, O14.1, O14.9, O15.0, O15.1, O15.2, O15.9
Type 2 diabetes mellitus	250.00, 250.1, 250.10, 250.11, 250.19, 250.3, 250.4, 250.5	E11

Supplementary Table 4. Baseline characteristics by combined lifestyle levels

Characteristics	Healthy	Intermediate	Unhealthy	<i>P</i> value ^a
	N = 370	N = 2,043	N = 696	
Age, years, mean (SD)	51.3 (8.4)	51.7 (8.5)	52.7 (8.5)	0.005
Race/ethnicity, n (%)				<0.001
Non-White	44 (11.9)	172 (8.4)	35 (5.0)	
White	326 (88.1)	1,871 (91.6)	661 (95.0)	
Education, n (%)				0.035
Low	126 (34.1)	779 (38.1)	292 (42.0)	
High	244 (65.9)	1,264 (61.9)	404 (58.0)	
BMI categories, n (%)				<0.001
Healthy (< 25.0 kg/m ²)	292 (78.9)	747 (36.6)	45 (6.5)	
Overweight (25.0–29.9 kg/m ²)	53 (14.3)	923 (45.2)	450 (64.7)	
Obese (≥30 kg/m ²)	25 (6.8)	373 (18.3)	201 (28.9)	
Smoking status, n (%)				<0.001
Never	359 (97.0)	1,499 (73.4)	179 (25.7)	
Former	6 (1.6)	432 (21.1)	413 (59.3)	
Current	5 (1.4)	112 (5.5)	104 (14.9)	
Alcohol consumption, n (%)				<0.001
Never	202 (54.6)	504 (24.7)	40 (5.7)	
≤ 7 standard drinks/week	138 (37.3)	1,276 (62.5)	540 (77.6)	
> 7 drinks/week or daily	30 (8.1)	263 (12.9)	116 (16.7)	

Sleep duration, n (%)				<0.001
Healthy	361 (97.6)	1,543 (75.5)	268 (38.5)	
Moderate	8 (2.2)	417 (20.4)	359 (51.6)	
Poor	1 (0.3)	83 (4.1)	69 (9.9)	
Diet quality, n (%)				<0.001
Healthy	112 (30.3)	457 (22.4)	139 (20.0)	
Moderate	194 (52.4)	1,049 (51.3)	357 (51.3)	
Unhealthy	64 (17.3)	537 (26.3)	200 (28.7)	
Physical activity, n (%)				<0.001
Active	306 (82.7)	749 (36.7)	53 (7.6)	
Moderate	52 (14.1)	893 (43.7)	420 (60.3)	
Inactive	12 (3.2)	401 (19.6)	223 (32.0)	

^aContinuous variables were compared across groups using analysis of variance, whereas categorical variables were compared using the chi-square test or Fisher's exact test, as appropriate.

Abbreviations: BMI, body mass index; SD, standard deviation.

Supplementary Table 5. Subgroup analyses for the association between combined healthy lifestyle and incident T2DM

	Cases / person years	Lifestyle categories	HR (95% CI) ^a	<i>P</i> for interaction ^b
PRS				0.247
High	59/4864.8	Unhealthy	Reference	
	106/14120.1	Intermediate	0.60 (0.44, 0.83)	
	10/2273.0	Healthy	0.32 (0.16, 0.65)	
Low	25/4639.0	Unhealthy	Reference	
	37/14491.9	Intermediate	0.46 (0.28, 0.75)	
	10/2998.7	Healthy	0.57 (0.28, 1.17)	
BMI categories				0.704
<30 kg/m ²	36/5910.6	Unhealthy	Reference	
	72/21368.0	Intermediate	0.49 (0.33, 0.73)	
	14/4778.2	Healthy	0.42 (0.22, 0.78)	
≥30 kg/m ²	50/3593.3	Unhealthy	Reference	
	70/7244.1	Intermediate	0.64 (0.44, 0.93)	
	5/493.5	Healthy	0.61 (0.24, 1.54)	
Age categories				0.780
<55 year	40/5419.1	Unhealthy	Reference	
	78/18192.9	Intermediate	0.49 (0.34, 0.73)	
	10/3448.9	Healthy	0.32(0.16, 0.65)	
≥55 year	46/4084.8	Unhealthy	Reference	
	64/10419.1	Intermediate	0.49 (0.34, 0.73)	
	9/1822.7	Healthy	0.44 (0.21, 0.90)	
Family history of diabetes				0.098
Yes	39/2001.1	Unhealthy	Reference	
	66/6724.8	Intermediate	0.43 (0.29, 0.65)	
	13/1219.8	Healthy	0.49 (0.26, 0.92)	
No	47/7502.8	Unhealthy	Reference	
	76/21887.3	Intermediate	0.58 (0.40, 0.84)	
	6/4051.9	Healthy	0.25 (0.10, 0.58)	

^aAdjusted for age, race/ethnicity, education level, parity, history of oral contraceptive use, and family history of diabetes.

^bInteraction terms between lifestyle categories and each stratifying variable were added to the model, and their statistical significance was evaluated by the likelihood ratio test.

Abbreviations: BMI, body mass index; CI, confidence interval; HR , hazard ratio; PRS; polygenic risk score; T2DM , type 2 diabetes mellitus.

Supplementary Table 6. Association of combined lifestyle with T2DM risk in women with a history of GDM or HDP.

Variable	Cases/person years	Lifestyle	HR (95% CI) ^a
History of GDM	51/2393.0	Unhealthy	Reference
	98/6530.8	Intermediate	0.63 (0.44, 0.88)
	14/1302.7	Healthy	0.43 (0.24, 0.77)
History of HDP	32/7097.7	Unhealthy	Reference
	40/21981.3	Intermediate	0.37 (0.24, 0.59)
	8/3961.0	Healthy	0.21 (0.07, 0.59)

^aAdjusted for age, race/ethnicity, education level, parity, history of oral contraceptive use, and family history of diabetes.

Abbreviations: CI, confidence interval; GDM, gestational diabetes mellitus; HDP, hypertensive disorders of pregnancy; HR, hazard ratio; T2DM, type 2 diabetes mellitus.