Supplementary Materials

Supplemental material

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Supplementary Table 1. Number of women included in analysis by lifestyle behavioral factor.									
Lifestyle behaviors	Main analysis			Restricted to women with < 5 years since last birth			Restricted to women living with children < 18 years		
	Total	No GDM	GDM	Total	No GDM	GDM	Total	No GDM	GDM
Diet									
Fruit and berries	7511	7386	125	2500	2417	83	6444	6333	111
Vegetables	7509	7384	125	2499	2417	82	6447	6335	112
Red meat	7551	7425	126	2513	2430	83	6479	6367	112
Fatty fish	7518	7392	126	2504	2421	83	6453	6341	112
Lean fish	7512	7386	126	2500	2417	83	6447	6335	112
Total fish	7522	7396	126	2504	2421	83	6455	6343	112
Beverages with added sugar	7477	7352	125	2486	2404	82	6425	6313	112
Alcohol	6909	6789	120	2243	2166	77	5909	5803	106
Physical activity	6278	6185	93	1977	1918	59	5376	5292	84
Current smoker	7531	7405	126	2503	2420	83	6464	6352	112
Sleep									
Sleep duration	7405	7279	126	2453	2370	83	6371	6259	112
Daytime dysfunction	7434	7311	123	2470	2389	81	6394	6283	111
Lifestyle perception									
Healthy lifestyle importance	7502	7376	126	2496	2413	83	6440	6328	112
Lifestyle satisfaction	7495	7370	125	2494	2411	83	6433	6322	111
Abbreviations: GDM=gestational diabetes mellitus									

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Supplementary Table 2. Outcome variable categorization and basis of definition				
VARIABLE NAME	**Questions HUNT4**	**Questions MHH**	**Dichotomization**	**BASIS OF CATEGORIZATION**
DIET (Based on Norwegian food-based dietary guidelines (NFBDG))				
Fruit and berries	How often do you eat the following food groups per week: Fruit and berries?* < once, 1-3 times, 4-6 times, ≥ 7 times	How many times per week and how much did you eat of the following? *Large fruit, medium fruit, small fruit and berries.*	a) ≥ 7 times per week b) < 7 times per week	*Recommended in NFBDG:* 250g fruit and/or berries every day (1).
Vegetables	How often do you eat the following food groups per week: Vegetables?* < once, 1-3 times, 4-6 times, ≥ 7 times	How many times per week and how much did you eat of the following? *Garlic, onion, tomato, tomato sauce, mixed salad and other vegetables.*	a) ≥ 7 times per week b) < 7 times per week	*Recommended in NFBDG:* 250g vegetables every day (1).
Red meat (Beef, pork, lamb, game)	How often do you eat the following food groups per week: Red meat?* < once, 1-3 times, 4-6 times, ≥ 7 times	How many times per week and how much did you eat of the following? *Unprocessed red meat and processed red meat.*	a) ≤ 3 times per week b) ≥ 4 times per week	*Recommended in NFBDG:* 500g per week à 2-3 dinners and some on bread (1).
Lean fish (E.g. cod, pollock)	How often do you eat the following food groups per week: Lean fish?* < once, 1-3 times, 4-6 times, ≥ 7 times	How many times per week and how much did you eat of the following? *Lean fish*	a) ≥ 1 time per week b) < 1 time per week	*Recommended in NFBDG:* Fish for dinner 2-3 times per week. Approximately 300-450 grams fish per week. At least 200g should be fatty fish(1).
Fatty fish (E.g. salmon, trout, herring, mackerel, haddock on bread/for dinner)	How often do you eat the following food groups per week: Fatty fish?* < once, 1-3 times, 4-6 times, ≥ 7 times	How many times per week and how much did you eat of the following? *Fatty fish*	a) ≥ 1 time per week b) < 1 time per week	
Total fish			a) ≥ 1 time per week b) < 1 time per week	Score a) on "lean fish" and/or "fatty fish" was set as "healthy intake"

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Alcohol	Total alcohol units per week	How many times per week and how much did you drink of the following? *Beer and wine with alcohol, and liquor.*	a) ≤ 7 units per week b) > 7 units per week	*Recommended in NFBDG and Nordic guidelines:* Intake should not exceed 10g (1 unit per day) for women (1). 1 unit is defined as 12 g alcohol corresponding to the alcohol content in one bottle of beer (330mL), one glass of wine (120mL), or one drink with liquor (40mL). The definition of a unit varies in different countries from approximately 8-12g.
Beverages with added sugar (Soda/squashes, juice, etc.)	How many glasses/cups of the following drinks do you usually drink/eat? *Soda/squashes/juice with sugar*	How many times per week and how much did you drink of the following? *Soda/squashes/juice and other beverages with added sugar.*	a) Never/rare b) ≥ 1 glass per week	*Recommended in NFBDG:* Limit the intake of beverages and foods with added sugar to less than 10% of total energy intake (1).
Smoking	What is your smoking status?		a) Never or former daily/-occasionally b) Current daily/-occasionally	
Physical activity *Moderate intensity* (Fast gait, hard housework or other activity which makes one short of breath) *High intensity* (Jogging, cross-country skiing or other activities that makes one very short of breath)	How hard do you exercise? (average) How many times per week do you exercise? For how long do you exercise each time?	How many times per week were you physical active at moderate intensity and for how long? How many times per week were you physical active at high intensity and for how long?	a) < 500 MET per week b) ≥ 500 MET per week	The metabolic equivalent of task (MET) is the objective measure of the ratio of the rate at which a person expends energy, relative to the mass of that person. Moderate intensity gives at least 3 MET per minute and high intensity at least 6 MET per minute. Weekly MET was calculated by combining weekly MET of moderate and high intensity exercise: Mod. intensity: Times per week * minutes per time * 3 High intensity: Times per week * minutes per time * 6 *Recommended is approximately > 500 MET per week, but > 900 MET is favorable (2).*

Sleep duration	How many hours of sleep do you get per night on a normal everyday:	How many hours of sleep do you get per night on a normal everyday/per 24 hours:	a) > 6 hours per night b) ≤ 6 hours per night	*Recommended in guidelines and similar Norwegian research:* > 6 hours of sleep per night is considered healthy, but 8-9 hours is preferable (3).
Daytime dysfunction due to insomnia	How often do you function poorly during day (socially/at work) due to insomnia?	How do you perceive your sleep quality lately:	HUNT: a) Never/rarely/sometimes b) ≥ 3 times per week MHH: a) (Very) good/median b) Bad/very bad	
Lifestyle importance	How important is it for you to live healthy?	How important is it for you to live healthy? (scale 1-5)	HUNT: a) (Very) important b) Less/not important MHH: a) ≥4 b) <4	
Lifestyle satisfaction	How satisfied are you with your own lifestyle (diet, physical activity, smoking- and drinking habits)?	How satisfied are you with your own lifestyle (diet, physical activity, smoking- and drinking habits)? (scale 1-5)	HUNT: a) Satisfied /very satisfied b) Less/not satisfied MHH: a) ≤2 b) >2	
Alternative a) is the measure set as "healthy" in our study. Cut off as close as possible to recommendations mentioned. Alternative b) is the measure set as "unhealthy" in our study. Cutoff as close as possible to recommendations mentioned. * Amount unknown 1. Kostrådene. Helsedirektoratet. [citation 19. april 2022]. Available at: https://www.helsedirektoratet.no/faglige-rad/kostradene-og-naeringsstoffer/kostrad-for-befolkningen 2. Kaminsky LA, Montoye AHK. Physical Activity and Health: What Is the Best Dose? J Am Heart Assoc. 3(5):e001430. 3. Johnsen MT, Wynn R, Bratlid T. Optimal Sleep Duration in the Subarctic with Respect to Obesity Risk. PLoS ONE. 15. februar 2013;8(2):e56756.				

Supplementary Table 3. Sensitivity analysis restricted to women with < 5 years since last birth. Unhealthy lifestyle behaviors and lifestyle perceptions in HUNT4 participants with a history of GDM relative to women without GDM.

	No history of GDM, n (%)	History of GDM, n (%)	p-value	Model 1 OR	(95% CI)	Model 2 OR	(95% CI)
Lifestyle behaviors							
Diet							
Fruit and berries (<7 times/week)	1845 (76.3)	67 (80.7)	0.35	1.30	(0.75-2.26)	1.27	(0.72-2.34)
Vegetables (<7 times/week)	1729 (71.5)	62 (75.6)	0.42	1.23	(0.74-2.06)	1.22	(0.72-2.06)
Red meat ($\geq$4 times/week)	334 (13.7)	11 (13.3)	0.90	0.96	(0.50-1.83)	0.94	(0.49-1.82)
Fatty fish (<1 times/week)	882 (36.4)	29 (34.9)	0.78	0.94	(0.59-1.48)	0.90	(0.57-1.43)
Lean fish (<1 times/week)	1058 (43.8)	37 (44.6)	0.88	1.03	(0.67-1.60)	1.06	(0.68-1.66)
Total fish (<1 times/week)	591 (24.4)	21 (25.3)	0.85	1.05	(0.63-1.74)	1.04	(0.63-1.74)
Beverages with added sugar ($\geq$ 1 glass/week)	1258 (52.3)	38 (46.3)	0.29	0.79	(0.51-1.22)	0.80	(0.51-1.26)
Alcohol (> 7 units/week)	16 (0.7)	1 (1.3)	0.58	1.77	(0.23-13.51)	1.78	(0.22-14.22)
Physical activity (<500 MET/week)	934 (48.7)	34 (57.6)	0.18	1.43	(0.85-2.42)	1.36	(0.80-2.31)
Current smoker	161 (6.7)	9 (10.8)	0.14	1.71	(0.84-3.47)	1.51	(0.72-3.17)
Sleep							
Sleep duration (<6 hours/night)	220 (9.2)	6 (7.2)	0.53	0.76	(0.33-1.77)	0.66	(0.28-1.54)
Daytime dysfunction	103 (4.3)	3 (3.7)	0.79	0.85	(0.26-2.75)	0.85	(0.26-2.76)
Lifestyle perception							
Healthy lifestyle not important	167 (6.9)	11 (13.3)	0.03	2.05	(1.07-3.95)	1.98	(1.00-3.91)
Not satisfied with own lifestyle	849 (35.2)	40 (48.2)	0.02	1.71	(1.10-2.65)	1.70	(1.09-2.66)

Data presented as odds ratio (OR) with 95% confidence interval (95% CI).

Abbreviations: GDM=gestational diabetes mellitus; MET=Metabolic Equivalent of Task.

Model 1 is unadjusted, model 2 is adjusted for age, birth country, cohabitant status, education, parity and time since last birth.

Supplementary Table 4. Sensitivity analysis restricted to women living with children < 18 years. Unhealthy lifestyle behaviors and lifestyle perceptions in HUNT4 participants with a history of GDM relative to women without GDM.

	No history of GDM, n (%)	History of GDM, n (%)	p-value	Model 1 OR	(95% CI)	Model 2 OR	(95% CI)
Lifestyle behaviors							
Diet							
Fruit and berries (<7 times/week)	4882 (77.1)	90 (81.1)	0.32	1.27	(0.79-2.06)	1.28	(0.78-2.08)
Vegetables (<7 times/week)	4584 (72.4)	88 (78.6)	0.15	1.40	(0.89-2.21)	1.42	(0.89-2.26)
Red meat ($\geq$4 times/week)	790 (12.4)	13 (11.6)	0.80	0.93	(0.52-1.66)	0.84	(0.47-1.52)
Fatty fish (<1 times/week)	2325 (36.7)	44 (39.3)	0.57	1.12	(0.76-1.64)	1.12	(0.76-1.66)
Lean fish (<1 times/week)	3126 (49.3)	51 (45.5)	0.42	0.86	(0.59-1.25)	0.98	(0.67-1.43)
Total fish (<1 times/week)	1663 (26.2)	33 (29.5)	0.44	1.18	(0.78-1.77)	1.25	(0.83-1.90)
Beverages with added sugar ($\geq$ 1 glass/week)	3059 (48.5)	47 (42.0)	0.17	0.77	(0.53-1.12)	0.69	(0.47-1.01)
Alcohol (> 7 units/week)	76 (1.3)	2 (1.9)	0.61	1.45	(0.35-5.98)	1.87	(0.44-7.88)
Physical activity (<500 MET/week)	2202 (41.6)	45 (53.6)	0.03	1.62	(1.05-2.49)	1.30	(0.84-2.03)
Current smoker	541 (8.5)	14 (12.5)	0.14	1.53	(0.87-2.70)	1.65	(0.90-2.99)
Sleep							
Sleep duration (<6 hours/night)	500 (8.0)	4 (3.6)	0.09	0.43	(0.16-1.16)	0.35	(0.13-0.97)
Daytime dysfunction	270 (4.3)	5 (4.5)	0.92	1.05	(0.42-2.60)	1.05	(0.42-2.62)
Lifestyle perception							
Healthy lifestyle not important	378 (6.0)	14 (12.5)	<0.01	2.25	(1.27-3.97)	1.95	(1.08-3.51)
Not satisfied with own lifestyle	1840 (29.1)	48 (43.2)	<0.01	1.86	(1.27-2.71)	1.57	(1.07-2.32)

Data presented as odds ratio (OR) with 95% confidence interval (95% CI).

Abbreviations: GDM=gestational diabetes mellitus; MET=Metabolic Equivalent of Task.

Model 1 is unadjusted, model 2 is adjusted for age, birth country, cohabitant status, education, parity and time since last birth.

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Supplementary Table 5. Sensitivity analysis including women with diagnosis of hypertension, CVD or diabetes and women with self-reported use of cholesterol lowering medication. Unhealthy lifestyle behaviors and lifestyle perception in HUNT4 participants with prior GDM relative to women without GDM.

	No History of GDM, n (%)	History of GDM, n (%)	p-value	Model 1 OR	(95% CI)	Model 2 OR	(95% CI)
Lifestyle behaviors							
Diet							
Fruit and berries (<7 times/week)	6148 (77.0)	144 (80.9)	0.22	1.27	(0.87-1.85)	1.30	(0.89-1.91)
Vegetables (<7 times/week)	5773 (72.3)	142 (79.8)	0.03	1.51	(1.04-2.18)	1.56	(1.07-2.28)
Red meat ($\geq$4 times/week)	1002 (12.5)	24 (13.4)	0.71	1.09	(0.70-1.68)	1.00	(0.64-1.55)
Fatty fish (<1 times/week)	2930 (36.7)	73 (40.8)	0.26	1.19	(0.88-1.61)	1.22	(0.90-1.65)
Lean fish (<1 times/week)	3898 (48.8)	90 (50.3)	0.7	1.06	(0.79-1.43)	1.21	(0.89-1.63)
Total fish (<1 times/week)	2101 (26.3)	60 (33.5)	0.03	1.41	(1.03-1.94)	1.54	(1.12-2.12)
Beverages with added sugar ($\geq$ 1 glass/week)	3738 (47.0)	71 (39.9)	0.06	0.75	(0.55-1.01)	0.69	(0.50-0.94)
Alcohol (> 7 units/week)	100 (1.4)	2 (1.2)	0.85	0.88	(0.21-3.58)	1.13	(0.27-4.67)
Physical activity (<500 MET/week)	2759 (41.4)	70 (54.7)	0.003	1.71	(1.20-2.42)	1.41	(0.98-2.01)
Current smoker	741 (9.3)	21 (11.7)	0.26	1.30	(0.82-2.07)	1.38	(0.85-2.23)
Sleep							
Sleep duration (<6 hours/night)	648 (8.2)	14 (7.9)	0.86	0.95	(0.55-1.65)	0.82	(0.47-1.43)
Daytime dysfunction	349 (4.4)	12 (6.9)	0.12	1.59	(0.88-2.89)	1.59	(0.87-2.92)
Lifestyle perception							
Healthy lifestyle not important	483 (6.1)	18 (10.1)	0.03	1.73	(1.06-2.85)	1.58	(0.95-2.62)
Not satisfied with own lifestyle	2326 (29.2)	83 (46.9)	<0.001	2.14	(1.59-2.89)	1.88	(1.39-2.55)

Data presented as odds ratio (OR) with 95% confidence interval (95% CI).

Abbreviations: GDM=gestational diabetes mellitus; MET=Metabolic Equivalent of Task.

Model 1 is unadjusted, model 2 is adjusted for age, birth country, cohabitant status, education, parity and time since last birth.