

Supplementary Table S1. Normality test results of baseline characteristics of participants according to occurrence of GDM among 30,740 pregnant women

Characteristics	Normality test	
	<i>D</i>	<i>P</i>
Age at pregnancy (years)		
Non-GDM	0.099189	< 0.01
GDM	0.08844	< 0.01
Pre-pregnancy BMI (kg/m ²)		
Non-GDM	0.094368	< 0.01
GDM	0.085348	< 0.01
Blood count parameters		
WBC (10 ⁹ /L)		
Non-GDM	0.05281	< 0.01
GDM	0.053004	< 0.01
RBC (10 ¹² /L)		
Non-GDM	0.028496	< 0.01
GDM	0.023229	< 0.01
HGB (g/L)		
Non-GDM	0.045397	< 0.01
GDM	0.056544	< 0.01
First-trimester FBG (mmol/L)		
Non-GDM	0.023259	< 0.01
GDM	0.04749	< 0.01
First-trimester blood lipid profiles (mmol/L)		
TC		
Non-GDM	0.039863	< 0.01
GDM	0.035917	< 0.01
TG		
Non-GDM	0.114367	< 0.01
GDM	0.106019	< 0.01
HDL-c		
Non-GDM	0.036211	< 0.01
GDM	0.043704	< 0.01
LDL-c		
Non-GDM	0.043825	< 0.01
GDM	0.044968	< 0.01

Note. Kolmogorov-Smirnov test was used for normality test. GDM: gestational diabetes mellitus, WBC: white blood cell, RBC: red blood cell, HGB: hemoglobin, TC: total cholesterol, TG: triglyceride, LDL-c: low-density lipoproteins cholesterol, HDL-c: high-density lipoproteins cholesterol, FBG: fasting blood glucose.

Supplementary Table S2. Normality test results of baseline characteristics of participants by ABO blood types among 30,740 pregnant women

Characteristics	Normality test	
	<i>D</i>	<i>P</i>
Age at pregnancy (years)		
O	0.101157	< 0.01
A	0.102499	< 0.01
B	0.094862	< 0.01
AB	0.097419	< 0.01
Pre-pregnancy BMI (kg/m ²)		
O	0.091883	< 0.01
A	0.091303	< 0.01
B	0.095523	< 0.01
AB	0.101993	< 0.01
Blood count parameters		
WBC (10 ⁹ /L)		
O	0.053387	< 0.01
A	0.049301	< 0.01
B	0.047074	< 0.01
AB	0.050673	< 0.01
RBC (10 ¹² /L)		
O	0.030752	< 0.01
A	0.033042	< 0.01
B	0.023954	< 0.01
AB	0.024856	< 0.01
HGB (g/L)		
O	0.047794	< 0.01
A	0.047624	< 0.01
B	0.048237	< 0.01
AB	0.039262	< 0.01
First-trimester FBG (mmol/L)		
O	0.036883	< 0.01
A	0.027773	< 0.01
B	0.032184	< 0.01
AB	0.043846	< 0.01
First-trimester blood lipid profiles (mmol/L)		
TC		
O	0.038472	< 0.01
A	0.044241	< 0.01
B	0.038278	< 0.01
AB	0.047551	< 0.01
TG		
O	0.119401	< 0.01
A	0.119744	< 0.01

B	0.116673	< 0.01
AB	0.110881	< 0.01
HDL-c		
O	0.035999	< 0.01
A	0.038565	< 0.01
B	0.037965	< 0.01
AB	0.034859	< 0.01
LDL-c		
O	0.044169	< 0.01
A	0.047861	< 0.01
B	0.048493	< 0.01
AB	0.045697	< 0.01

Note. Kolmogorov-Smirnov test was used for normality test. GDM: gestational diabetes mellitus, WBC: white blood cell, RBC: red blood cell, HGB: hemoglobin, TC: total cholesterol, TG: triglyceride, LDL-c: low-density lipoproteins cholesterol, HDL-c: high-density lipoproteins cholesterol, FBG: fasting blood glucose.

Supplementary Table S3. Relationship between ABO blood types and GDM risk among 30,740 pregnant women

Characteristics	ABO Blood Types			
	O	A	B	AB
Total cohort (<i>n</i> = 30,740)				
<i>OR</i> (95% <i>CI</i>) *	1	1.05 (0.96-1.14)	1.03 (0.95-1.11)	1.21 (1.08-1.35)
<i>OR</i> (95% <i>CI</i>) #	1	1.05 (0.96-1.15)	1.04 (0.95-1.13)	1.19 (1.05-1.34)
Age at pregnancy				
< 35 years (<i>n</i> = 25,177)				
<i>OR</i> (95% <i>CI</i>) *	1	1.02 (0.92-1.13)	1.03 (0.93-1.13)	1.16 (1.01-1.32)
<i>OR</i> (95% <i>CI</i>) #	1	1.02 (0.92-1.13)	1.03 (0.93-1.14)	1.12 (0.97-1.29)
≥ 35 years(<i>n</i> = 5,563)				
<i>OR</i> (95% <i>CI</i>) *	1	1.11 (0.95-1.31)	1.03 (0.88-1.21)	1.39 (1.12-1.72)
<i>OR</i> (95% <i>CI</i>) #	1	1.1 (0.92-1.31)	1.05 (0.89-1.24)	1.33 (1.05-1.67)
Pre-pregnancy BMI				
< 24 kg/m ² (<i>n</i> = 24,566)				
<i>OR</i> (95% <i>CI</i>) *	1	1.02 (0.92-1.13)	0.98 (0.89-1.08)	1.16 (1.01-1.33)
<i>OR</i> (95% <i>CI</i>) #	1	1.02 (0.92-1.14)	0.98 (0.89-1.09)	1.17 (1.01-1.34)
≥ 24 kg/m ² (<i>n</i> = 6,174)				
<i>OR</i> (95% <i>CI</i>) *	1	1.04 (0.89-1.22)	1.1 (0.95-1.27)	1.2 (0.98-1.46)
<i>OR</i> (95% <i>CI</i>) #	1	1.11 (0.93-1.31)	1.18 (1-1.38)	1.22 (0.98-1.51)
Education level				
Below college (<i>n</i> = 6,481)				
<i>OR</i> (95% <i>CI</i>) *	1	1 (0.84-1.19)	1.04 (0.88-1.23)	1.08 (0.86-1.35)
<i>OR</i> (95% <i>CI</i>) #	1	1.03 (0.85-1.24)	1.07 (0.89-1.27)	1.04 (0.81-1.33)

Undergraduate/College ($n = 16,765$)				
<i>OR</i> (95% <i>CI</i>) *	1	1.07 (0.96-1.2)	1.03 (0.93-1.15)	1.23 (1.06-1.43)
<i>OR</i> (95% <i>CI</i>) #	1	1.08 (0.96-1.22)	1.07 (0.95-1.2)	1.25 (1.07-1.47)
Postgraduate or higher($n = 7,494$)				
<i>OR</i> (95% <i>CI</i>) *	1	1.02 (0.85-1.23)	0.99 (0.83-1.17)	1.25 (0.99-1.6)
<i>OR</i> (95% <i>CI</i>) #	1	1.01 (0.83-1.22)	0.95 (0.79-1.15)	1.21 (0.94-1.57)
Menstrual status				
Regularity ($n = 25,376$)				
<i>OR</i> (95% <i>CI</i>) *	1	0.87 (0.72-1.05)	0.88 (0.73-1.06)	1.15 (0.9-1.46)
<i>OR</i> (95% <i>CI</i>) #	1	0.9 (0.73-1.1)	0.9 (0.74-1.09)	1.18 (0.91-1.54)
Irregularity ($n = 5,364$)				
<i>OR</i> (95% <i>CI</i>) *	1	1.09 (0.99-1.2)	1.06 (0.97-1.16)	1.21 (1.07-1.37)
<i>OR</i> (95% <i>CI</i>) #	1	1.09 (0.99-1.21)	1.08 (0.98-1.19)	1.19 (1.04-1.36)
Fertilization way				
Natural pregnancy ($n = 28,887$)				
<i>OR</i> (95% <i>CI</i>) *	1	1.04 (0.95-1.13)	1.02 (0.94-1.11)	1.16 (1.03-1.3)
<i>OR</i> (95% <i>CI</i>) #	1	1.05 (0.95-1.15)	1.04 (0.95-1.13)	1.15 (1.01-1.3)
Assisted reproductive techniques ($n = 1,853$)				
<i>OR</i> (95% <i>CI</i>) *	1	1.11 (0.83-1.49)	1.11 (0.83-1.48)	1.59 (1.11-2.28)
<i>OR</i> (95% <i>CI</i>) #	1	1.1 (0.8-1.52)	1.1 (0.81-1.5)	1.63 (1.1-2.41)
First-trimester blood lipid profiles				
Normal ($n = 27,724$)				
<i>OR</i> (95% <i>CI</i>) *	1	1.03 (0.95-1.13)	1.01 (0.93-1.1)	1.15 (1.03-1.3)
<i>OR</i> (95% <i>CI</i>) #	1	1.05 (0.95-1.15)	1.01 (0.93-1.11)	1.17 (1.03-1.32)

Abnormal (<i>n</i> = 1,655)				
<i>OR</i> (95% <i>CI</i>) *	1	1.13 (0.85-1.5)	1.25 (0.95-1.65)	1.78 (1.23-2.56)
<i>OR</i> (95% <i>CI</i>) #	1	1.16 (0.85-1.58)	1.18 (0.87-1.59)	1.57 (1.05-2.35)

Note. **Unadjusted.* #Adjusted for age at pregnancy, education level, family annual income, pre-pregnancy BMI, smoking, menstrual status, primigravida status, history of GDM, history of adverse pregnancy outcomes, fertilization way, multivitamin supplementation, and first-trimester laboratory measurements including WBC and RBC counts, HGB, TG, LDL-c, HDL-c, and FBG levels. GDM: gestational diabetes mellitus, CNY: Chinese Yuan, BMI: body mass index, WBC: white blood cell, RBC: red blood cell, HGB: hemoglobin, TC: total cholesterol, TG: triglyceride, LDL-c: low-density lipoproteins cholesterol, HDL-c: high-density lipoproteins cholesterol, FBG: fasting blood glucose, *OR*: odds ratio, *CI*: confidence interval.

Supplementary Table S4. Sensitivity analysis of the relationship between ABO blood types and GDM risk within the birth cohort study by excluding participants with a history of GDM

Characteristics	ABO Blood Types			
	O	A	B	AB
OR (95% CI) *	1	1.04 (0.95-1.13)	1.02 (0.94-1.11)	1.20 (1.07-1.34)
OR (95% CI) #	1	1.03 (0.94-1.13)	1.03 (0.94-1.12)	1.18 (1.04-1.33)

Note. *Unadjusted. #Adjusted for age at pregnancy, education level, family annual income, pre-pregnancy BMI, smoking, menstrual status, primigravida status, history of GDM, history of adverse pregnancy outcomes, fertilization way, multivitamin supplementation, and first-trimester laboratory measurements including WBC and RBC counts, HGB, TG, LDL-c, HDL-c, and FBG levels. GDM: gestational diabetes mellitus, CNY: Chinese Yuan, BMI: body mass index, WBC: white blood cell, RBC: red blood cell, HGB: hemoglobin, TC: total cholesterol, TG: triglyceride, LDL-c: low-density lipoproteins cholesterol, HDL-c: high-density lipoproteins cholesterol, FBG: fasting blood glucose, *OR*: odds ratio, *CI*: confidence interval.

Supplementary Table S5. Differences in the distribution of covariates between subjects with and without missing data

Characteristics	Group A*	Group B†	P
Total, N	27448	3292	
Age at pregnancy (years)	31.88±3.85	31.19±3.99	< 0.001
Pre-pregnancy BMI (kg/m²)	21.84±3.52	21.54±3.40	< 0.001
Ethnicity			0.647
Han	25342 (92.33)	3032 (92.10)	
Others	2106 (7.67)	260 (7.90)	
Education level			< 0.001
Below college	5630 (20.51)	851 (25.85)	
Undergraduate/College	15109 (55.05)	1656 (50.30)	
Postgraduate or higher	6709 (24.44)	785 (23.85)	
Family annual income (CNY)			< 0.001
< 100,000	3070 (11.18)	430 (13.06)	
100,000-200,000	7475 (27.23)	930 (28.25)	
200,000-400,000	10116 (36.86)	1088 (33.05)	
> 400,000	6787 (24.73)	844 (25.64)	
Smoking			0.920
No	26598 (96.90)	3189 (96.87)	
Yes	850 (3.10)	103 (3.13)	
Alcohol consumption			0.725
No	26086 (95.04)	3124 (94.90)	
Yes	1362 (4.96)	168 (5.10)	
Menstrual status			0.233
Regularity	4765 (17.36)	599 (18.20)	

Irregularity	22683 (82.64)	2693 (81.80)	
Primigravida status			< 0.001
No	13009 (47.40)	1431 (43.47)	
Yes	14439 (52.60)	1861 (56.53)	
History of GDM			0.047
No	26787 (97.59)	3231 (98.15)	
Yes	661 (2.41)	61 (1.85)	
History of adverse pregnancy outcomes			< 0.001
No	22922 (83.51)	2829 (85.94)	
Yes	4526 (16.49)	463 (14.06)	
Fertilization way			0.973
Natural pregnancy	25793 (93.97)	3094 (93.99)	
Assisted reproductive techniques	1655 (6.03)	198 (6.01)	
Folic acid supplementation			0.368
No	3036 (11.06)	347 (10.54)	
Yes	24412 (88.94)	2945 (89.46)	
Multivitamin supplementation			< 0.001
No	6154 (22.42)	836 (25.39)	
Yes	21294 (77.58)	2456 (74.61)	

Note. *Participants without missing covariates data. [†]Participants with missing covariates data. GDM: gestational diabetes mellitus, CNY: Chinese Yuan, BMI: body mass index, SII: systemic immune-inflammation index, SIRI: system inflammation response index. WBC: white blood cell, Neut: neutrophils, Lymph: lymphocytes, Mono: monocytes, PLT: platelets, RBC: red blood cell, TC: total cholesterol, TG: triglyceride, LDL-c: low-density lipoproteins cholesterol, HDL-c: high-density lipoproteins cholesterol, FBG: fasting blood glucose, OGTT: oral glucose tolerance test.

Supplementary Table S6. Sensitivity analysis of the association between ABO blood types and the risk of GDM using raw data, mean imputation, and multiple imputation methods			
ABO Blood Types		OR (95% CI) *	P
Raw data			
O		1	
A		1.05 (0.95-1.15)	0.3238
B		1.03 (0.94-1.13)	0.5339
AB		1.18 (1.04-1.34)	0.0087
Mean Imputation			
O		1	
A		1.05 (0.96-1.15)	0.2952
B		1.04 (0.95-1.13)	0.3954
AB		1.19 (1.05-1.34)	0.0047
Multiple Imputation			
Imputation 1			
O		1	
A		1.05 (0.96-1.15)	0.3075
B		1.04 (0.95-1.13)	0.3907
AB		1.19 (1.05-1.34)	0.0048
Imputation 2			
O		1	
A		1.05 (0.96-1.15)	0.2918
B		1.04 (0.95-1.13)	0.389
AB		1.19 (1.05-1.34)	0.005
Imputation 3			
O		1	

A	1.05 (0.96-1.15)	0.3277
B	1.03 (0.95-1.13)	0.4663
AB	1.18 (1.05-1.33)	0.0058
Imputation4		
O	1	
A	1.05 (0.96-1.15)	0.3179
B	1.04 (0.95-1.13)	0.4111
AB	1.18 (1.05-1.33)	0.0059
Imputation5		
O	1	
A	1.04 (0.95-1.14)	0.3494
B	1.04 (0.95-1.13)	0.4197
AB	1.19 (1.06-1.34)	0.0046
Combining effects (5 Imputations)		
O	1	
A	1.05 (0.96-1.15)	0.319
B	1.04 (0.95-1.13)	0.4156
AB	1.19 (1.05-1.34)	0.0052

Supplementary Table S7. Baseline characteristics: missing ABO blood types data or GDM follow-up losses versus included participants

Characteristics	Group A*	Group B†	P
Total, N	30,740	2,067	
Age at pregnancy (years)	31.81 ± 3.87	31.68 ± 3.81	0.088
Pre-pregnancy BMI (kg/m²)	21.81 ± 3.51	22.03 ± 4.89	0.968
Ethnicity			0.268
Han	28374 (92.30)	1894 (91.63)	
Others	2366 (7.70)	173 (8.37)	
Education level			< 0.001
Below college	6481 (21.08)	522 (25.25)	
Undergraduate/College	16765 (54.54)	1051 (50.85)	
Postgraduate or higher	7494 (24.38)	494 (23.90)	
Family annual income (CNY)			< 0.001
< 100,000	3500 (11.39)	339 (16.40)	
100,000-200,000	8405 (27.34)	573 (27.72)	
200,000-400,000	11204 (36.45)	643 (31.11)	
> 400,000	7631 (24.82)	512 (24.77)	
Smoking			0.275
No	29787 (96.90)	1994 (96.47)	
Yes	953 (3.10)	73 (3.53)	
Alcohol consumption			< 0.001
No	29210 (95.02)	1915 (92.65)	
Yes	1530 (4.98)	152 (7.35)	
Menstrual status			0.641
Regularity	5364 (17.45)	369 (17.85)	

Irregularity	25376 (82.55)	1698 (82.15)	
Primigravida status			0.001
No	14440 (46.97)	1048 (50.70)	
Yes	16300 (53.03)	1019 (49.30)	
History of GDM			0.001
No	30018 (97.65)	1995 (96.52)	
Yes	722 (2.35)	72 (3.48)	
History of adverse pregnancy outcomes			0.312
No	25751 (83.77)	1714 (82.92)	
Yes	4989 (16.23)	353 (17.08)	
Fertilization way			0.069
Natural pregnancy	28887 (93.97)	1922 (92.99)	
Assisted reproductive techniques	1853 (6.03)	145 (7.01)	
Folic acid supplementation			0.395
No	3383 (11.01)	240 (11.61)	
Yes	27357 (88.99)	1827 (88.39)	
Multivitamin supplementation			0.061
No	6990 (22.74)	507 (24.53)	
Yes	23750 (77.26)	1560 (75.47)	

Note. *Participants finally included in the analysis. [†]Participants with missing blood types or lost to follow-up with GDM. GDM: gestational diabetes mellitus, CNY: Chinese Yuan, BMI: body mass index, SII: systemic immune-inflammation index, SIRI: system inflammation response index. WBC: white blood cell, Neut: neutrophils, Lymph: lymphocytes, Mono: monocytes, PLT: platelets, RBC: red blood cell, TC: total cholesterol, TG: triglyceride, LDL-c: low-density lipoproteins cholesterol, HDL-c: high-density lipoproteins cholesterol, FBG: fasting blood glucose, OGTT: oral glucose tolerance test.