

Additional file 1. Calculation formula

1. UACR calculation formula

$$\text{UACR} = \frac{\text{Albumin } (\mu\text{g/L})}{\text{Creatinine } (\text{mg/dL})} \times 100$$

2. logeGDR calculation formula

$$\log_e(\text{GDR}) = 5.3505 - 0.3697 \cdot \ln(\gamma \text{ glutamyltransferase } (U/L)) - 0.2591 \cdot \ln(\text{Triglyceride } (\text{mg/dL})) - 0.1169 \cdot \ln(\text{UACR}) - 0.0279 \cdot \text{BMI}(\text{kg/m}^2)$$

3. GDR calculation formula

$$\text{GDR} = \exp(\log_e(\text{GDR}))$$

Supplementary Table SI. Sensitivity analysis (removal of missing covariate values, removal of population with underlying diseases, unweighted)

Characteristic	Consumption of coffee				
	Not drink coffee	Q1 Cup/d	Q2 Cup/d	Q3 Cup/d	Q4 Cup/d
Deleting missing values					
Drink coffee in morning					
Model 1	1 [Reference]	1.46 (1.21, 1.77)	1.27 (1.11, 1.45)	1.20 (1.01, 1.43)	1.13 (0.95, 1.34)
Model 2	1 [Reference]	1.44 (1.17, 1.76)	1.26 (1.09, 1.45)	1.21 (1.00, 1.46)	1.15 (0.96, 1.34)

Model 3	1 [Reference]	1.46 (1.17, 1.82)	1.25 (1.07, 1.45)	1.17 (0.96, 1.42)	1.08 (0.90, 1.30)
Drink coffee all day					
Model 1	1 [Reference]	1.13 (0.75, 1.70)	1.05 (0.81, 1.38)	1.51 (1.14, 1.99)	1.41 (1.13, 1.75)
Model 2	1 [Reference]	1.22 (0.82, 1.83)	1.10 (0.84, 1.44)	1.56 (1.17, 2.08)	1.49 (1.17, 1.89)
Model 3	1 [Reference]	1.19 (0.78, 1.82)	1.11 (0.83, 1.49)	1.59 (1.18, 2.13)	1.35 (1.07, 1.70)
Delete the population with diseases					
Drink coffee in morning					

Model 1	1 [Reference]	1.27 (0.94, 1.71)	1.18 (0.98, 1.43)	1.07 (0.84, 1.37)	0.91 (0.71, 1.16)
Model 2	1 [Reference]	1.26 (0.94, 1.69)	1.16 (0.95, 1.42)	1.09 (0.84, 1.41)	0.92 (0.71, 1.21)
Drink coffee all day					
Model 1	1 [Reference]	1.23 (0.75, 2.00)	0.88 (0.62, 1.26)	1.19 (0.81, 1.75)	1.36 (1.02, 1.82)
Model 2	1 [Reference]	1.34 (0.83, 2.19)	0.96 (0.67, 1.38)	1.25 (0.83, 1.87)	1.47 (1.08, 2.01)
Without imputation					
Drink coffee in morning					
Model 1	1 [Reference]	1.10 (0.98, 1.24)	1.11 (1.03, 1.21)	1.15 (1.03, 1.29)	1.11 (0.99, 1.24)

Model 2	1 [Reference]	1.13 (0.99, 1.27)	1.14 (1.05, 1.25)	1.16 (1.03, 1.30)	1.13 (1.01, 1.27)
Model 3	1 [Reference]	1.14 (1.00, 1.30)	1.13 (1.04, 1.24)	1.12 (0.99, 1.27)	1.03 (0.92, 1.17)
Drink coffee all day					
Model 1	1 [Reference]	1.15 (0.92, 1.44)	0.99 (0.85, 1.16)	1.28 (1.08, 1.50)	1.25 (1.10, 1.43)
Model 2	1 [Reference]	1.21 (0.96, 1.52)	1.05 (0.89, 1.24)	1.35 (1.14, 1.60)	1.31 (1.14, 1.50)
Model 3	1 [Reference]	1.15 (0.91, 1.47)	1.05 (0.89, 1.25)	1.36 (1.14, 1.63)	1.19 (1.03, 1.37)

Supplementary Table SII. Effect of coffee composition (caffeine) on GDR levels

Characteristic	Case [H/L of GDR]	Weighting ratio (%)	Odds ratio (95% CI)		
			Model 1	Model 2	Model 3
Drink decaffeinated coffee					
Drink coffee in morning					
Not drink coffee	4186/5981	56.0	1 [Reference]	1 [Reference]	1 [Reference]
Q1 Cup/d	76/172	62.5	1.11 (0.74, 1.67)	1.16 (0.80, 1.68)	1.29 (0.86, 1.95)

Q2 Cup/d	204/384	57.3	1.37 (1.05, 1.78)	1.39 (1.07, 1.82)	1.49 (1.13, 1.98)
Q3 Cup/d	74/119	57.8	1.42 (0.93, 2.16)	1.29 (0.85, 1.98)	1.32 (0.84, 2.07)
Q4 Cup/d	71/148	62.4	1.17 (0.80, 1.71)	1.17 (0.79, 1.73)	1.24 (0.83, 1.86)
Drink coffee all day					
Not drink coffee	4186/5981	56.0	1 [Reference]	1 [Reference]	1 [Reference]
Q1 Cup/d	30/46	50.0	1.83 (0.81, 4.16)	2.00 (0.95, 4.19)	2.16 (0.99, 4.72)
Q2 Cup/d	53/103	54.7	1.57 (0.97, 2.55)	1.57 (0.96, 2.56)	1.50 (0.85, 2.65)
Q3 Cup/d	55/75	53.8	1.62 (0.95, 2.79)	1.63 (0.94, 2.82)	1.52 (0.83, 2.77)

Q4 Cup/d	100/134	56.1	1.54 (1.09, 2.17)	1.54 (1.08, 2.21)	1.35 (0.93, 1.96)
Drink caffeinated coffee					
Drink coffee in morning					
Not drink coffee	4186/5981	56.0	1 [Reference]	1 [Reference]	1 [Reference]
Q1 Cup/d	450/687	52.4	1.39 (1.16, 1.66)	1.38 (1.15, 1.66)	1.38 (1.12, 1.69)
Q2 Cup/d	1138/1791	55.7	1.26 (1.10, 1.44)	1.25 (1.09, 1.44)	1.22 (1.06, 1.42)
Q3 Cup/d	539/859	57.0	1.22 (1.03, 1.45)	1.25 (1.03, 1.50)	1.23 (1.01, 1.49)
Q4 Cup/d	574/928	58.5	1.16 (0.98, 1.37)	1.20 (1.01, 1.43)	1.18 (0.99, 1.41)

Drink coffee all day

Not drink coffee	4186/5981	56.0	1 [Reference]	1 [Reference]	1 [Reference]
Q1 Cup/d	111/157	54.6	1.14 (0.76, 1.72)	1.21 (0.81, 1.80)	1.17 (0.78, 1.76)
Q2 Cup/d	237/405	61.7	0.91 (0.71, 1.17)	0.94 (0.73, 1.21)	0.96 (0.73, 1.26)
Q3 Cup/d	239/354	52.9	1.43 (1.10, 1.87)	1.51 (1.15, 1.98)	1.52 (1.16, 2.01)
Q4 Cup/d	395/617	56.2	1.35 (1.11, 1.64)	1.44 (1.16, 1.77)	1.37 (1.12, 1.68)

Supplementary Table SIII. Effect of coffee additive (sugar) on GDR levels

Characteristic	Case [H/L of GDR]	Weighting ratio (%)	Odds ratio (95% CI)		
			Model 1	Model 2	Model 3
No sugar					
Drink coffee in morning					
Not drink coffee	4186/5981	56.0	1 [Reference]	1 [Reference]	1 [Reference]
Q1 Cup/d	493/812	53.4	1.39 (1.17, 1.64)	1.36 (1.14, 1.63)	1.38 (1.13, 1.69)

Q2 Cup/d	1264/2068	56.1	1.28 (1.13, 1.45)	1.27 (1.11, 1.44)	1.25 (1.09, 1.44)
Q3 Cup/d	586/926	56.7	1.27 (1.07, 1.50)	1.28 (1.07, 1.53)	1.26 (1.04, 1.52)
Q4 Cup/d	625/1027	58.6	1.18 (1.00, 1.38)	1.21 (1.02, 1.42)	1.19 (1.01, 1.41)
Drink coffee all day					
Not drink coffee	4186/5981	56.0	1 [Reference]	1 [Reference]	1 [Reference]
Q1 Cup/d	129/183	54.5	1.22 (0.84, 1.78)	1.33 (0.91, 1.92)	1.29 (0.88, 1.89)
Q2 Cup/d	239/433	60.7	1.02 (0.80, 1.30)	1.07 (0.83, 1.38)	1.11 (0.84, 1.45)
Q3 Cup/d	232/373	55.0	1.40 (1.06, 1.85)	1.47 (1.11, 1.95)	1.45 (1.09, 1.93)

Q4 Cup/d	403/651	56.4	1.38 (1.13, 1.69)	1.47 (1.19, 1.82)	1.39 (1.12, 1.72)
With sugar					
Drink coffee in morning					
Not drink coffee	4186/5981	56.0	1 [Reference]	1 [Reference]	1 [Reference]
Q1 Cup/d	31/37	52.4	0.72 (0.33, 1.58)	0.73 (0.31, 1.76)	1.24 (0.65, 2.38)
Q2 Cup/d	61/75	50.1	1.18 (0.61, 2.28)	1.04 (0.55, 1.96)	1.12 (0.65, 1.93)
Q3 Cup/d	12/32	71.7	0.81 (0.17, 3.82)	1.03 (0.22, 4.85)	0.46 (0.15, 1.38)
Q4 Cup/d	14/21	51.7	0.88 (0.29, 2.68)	1.11 (0.35, 3.54)	1.22 (0.49, 3.02)

Drink coffee all day

Not drink coffee	4186/5981	56.0	1 [Reference]	1 [Reference]	1 [Reference]
Q1 Cup/d	11/16	53.1	0.81 (0.18, 3.74)	0.62 (0.16, 2.52)	0.96 (0.24, 3.83)
Q2 Cup/d	33/48	63.1	0.67 (0.22, 2.03)	0.65 (0.19, 2.14)	0.62 (0.26, 1.49)
Q3 Cup/d	39/27	38.7	1.20 (0.38, 3.80)	1.31 (0.35, 4.89)	2.32 (0.91, 5.95)
Q4 Cup/d	36/37	60.5	1.23 (0.57, 2.65)	1.29 (0.56, 2.98)	0.87 (0.47, 1.58)
