

2-h Postprandial Blood Glucose Lower Than Fasting Blood Glucose in China: a cross-sectional study

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Abstract

Background

Usually blood glucose levels measured in the fasted status (fasting blood glucose) are lower than blood glucose levels in the fed status (postprandial blood glucose). However, postprandial blood glucose (PBG) levels lower than fasting blood glucose (FBG) can be found in some cases.

Aims

This study aims to describe the prevalence, clinical characteristics, and contributing risk factors for $PBG \leq FBG$.

Method

In a nationwide cohort study [the National Key R&D Program of China (2016YFC1305700)] conducted in China, 16,116 people had an oral glucose tolerance test, in addition to blood haematology, biochemistry tests, sociodemographic and anthropometric data collection. We calculated the prevalence of $PBG \leq FBG$ ('Low Post Load' group) and $PBG > FBG$ ('High Post Load' group), and used logistic regression to evaluate the association of $PBG \leq FBG$ with risk factors.

Results

A total of 16,116 natural population [mean age: 49.95±11.82 years old; 10,635 females(65.99%); mean BMI:25.07±3.86 kg/m²] were included. The prevalence of PBG≤FBG was 24.13% ('Low Post Load' group, n=3,889) and PBG>FBG was 75.87% ('High Post Load' group, n=12,227).

Compared with participants in High Post Load group, participants in Low Post Load group had lower FBG (5.53±0.88 vs 5.70±1.28, P<0.000), PBG (4.64±0.91 vs 8.03±3.13, P<0.000) and HbA1c(5.33±0.52 vs 5.55±0.83, P<0.000). People with PBG≤FBG were more likely to have hypoglycaemia incidence and impaired fasting glucose (FBG: 6.1-6.9mmol/L) compared with people with PBG>FBG (P<0.000).

In logistic regression analyses PBG≤FBG was associated with age<44 years; male; Uyghur or Zhuang ethnicity; BMI<24kg/m²; normal blood pressure; heart rate<100 beats/min; status as never be a drinker or former be a drinker; HDL cholesterol≥1.55 mmol/L; triglycerides<1.70 mmol/L, all P<0.000.

Conclusion

PBG≤FBG is related to young age, lower BMI, lower blood pressure, higher HDL cholesterol levels and lower triglycerides levels. People with PBG≤FBG were more likely to have impaired fasting glucose compared with people with PBG>FBG. The relationship between this phenomenon and the progression to diabetes needs further exploration in longitudinal analyses.

Table . Glucose information

Mean(SD)	All (n=16,116)	PBG≤FBG (n=3,889)	PBG>FBG	P-value
Age(years)	49.95±11.82	46.83±12.75	50.93±11.33	<0.000
Female,n%	10,635(65.99%)	2,185(56.18%)	8,450(69.11%)	<0.001
BMI(kg/m ²)	25.07±3.86	24.23±3.67	25.34±3.88	<0.000
FBG	5.66±1.20	5.53±0.88	5.70±1.28	<0.000
PBG	7.21±3.12	4.64±0.91	8.03±3.13	<0.000
HbA1c	5.50±0.77	5.33±0.52	5.55±0.83	<0.000
Hypoglycaemia,n(%)	127(0.79%)	86(2.21%)	41(0.34%)	<0.001

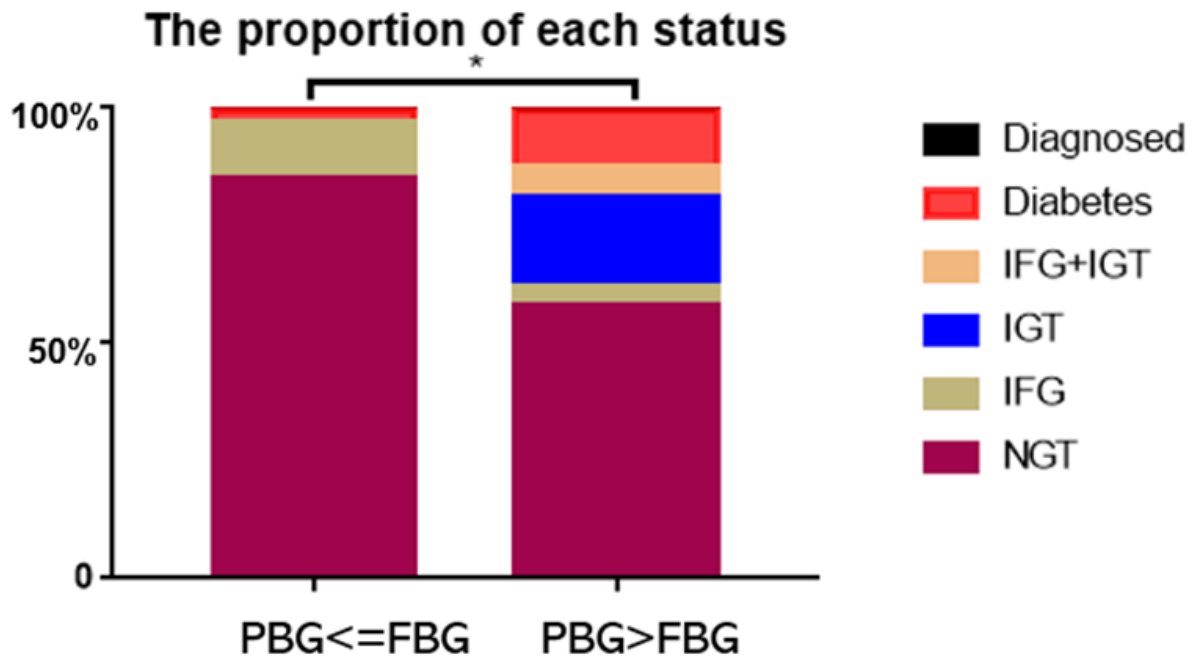


Fig. The proportion of each status

The proportion of each status was categorised by WHO diagnostic criteria(1999). The fasting blood glucose (FBG) of normoglycaemia people has been set at 3.9–6.1 mmol/L and the 2h-postprandial blood glucose at 7.8 mmol/L or less; Impaired fasting glucose(IFG) was defined as an FBG of equal or greater than 6.1 mmol/L and less than 7.0 mmol/L, and PBG at 120 min after oral glucose loading less than 7.8 mmol/L; Impaired glucose tolerance(IGT) was defined as an FBG of less than 6.1 mmol/L, and PBG at 120 min after oral glucose loading of equal or greater than 7.8 mmol/L and less than 11.1 mmol/L; Patients with typical symptoms of diabetes (polyuria, polydipsia and unexplained weight loss) who have arbitrary blood glucose ≥ 11.1 mmol/L, $\text{FBG} \geq 7.0$ mmol/L or 2h-postprandial blood ≥ 11.1 mmol/L, which means diabetes can be diagnosed; Diagnosed: according to participants self-report with history of diabetes. *P < 0.05.