Blood glucose levels at baseline and incidence of type 2 diabetes: a prospective cohort study of 0.5 million adults in the China Kadoorie Biobank


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Background and aims: Random blood glucose (RBG) levels may be used to screen for diabetes, however the predictive value of RBG levels within the normoglycemic range on future diabetes risk has not been well studied, particularly among Chinese population.

Materials and methods: The study population includes 496,720 individuals enrolled into the China Kadoorie Biobank between 2004-8 from 10 diverse localities across China without prior physician diagnosed diabetes. At baseline, RBG was measured by venous blood spot test and those with RBG ≥ 11.1 mmol/L and those fasting blood glucose ≥ 7.0 mmol/L were identified as newly detected diabetes (2.8%) and excluded from the current analysis. Data on type 2 diabetes incidence was collected through electronic linkage with mortality and morbidity registries as well as with the national health insurance system. RBG was related to incidence of type 2 diabetes using Cox proportional Hazard models, with adjustment for potential confounders.

Results: The overall mean age of participants (n=474,423) was 51 years, mean BMI was 23.6 kg/m², and mean RBG was 5.7 mmol/L. During the 7-year follow-up, 4194 incident cases of type 2 diabetes were identified. A dose-response relationship was observed between baseline RBG and risk of diabetes. Compared to those with RBG < 6.0 mmol/L, those with 6.0 ≤ RBG < 6.9 mmol/L had a diabetes hazard ratio (HR) 2.8 (95% CI: 2.7-2.9), those with 7.0 ≤ RBG < 7.8 mmol/L had HR 3.8 (3.5-4.1) and those with RBG ≥ 7.8 (i.e. pre-diabetes) had HR 6.8 (6.3-7.4). The association of RBG with diabetes risk was slightly stronger in women than in men, and in younger than in older people. Stratifying the analyses by hours since last meal (< 2 hours, 2-4 hours, 4-6 hours, or ≥ 6 hours) revealed a stronger association among those who had fasted for a longer period (HR of RGB ≥ 7.8 mmol/L 12.0 [5.3-27.2]).

Conclusion: In this group of adult Chinese, higher RBG levels, even those within the normoglycemic range, constitute an independent risk factor for type 2 diabetes. Such levels should probably be taken into account in identifying people at increased risk for diabetes.

Supported by: Wellcome Trust; MRC; British Heart Foundation; Cancer Research UK; ChinaTRD