



# Prevalence of Diabetes and Regional Differences in Chinese Women Planning Pregnancy: A Nationwide Population-Based Cross-sectional Study

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Diabetes is closely linked with women's health, and the Endocrine Society recommends that preconception consulting is provided to all women with diabetes who are considering pregnancy (1). However, the prevalence of hyperglycemia in this population is unknown and identifying diabetes before conception remains a challenge. Risk factor-based screening for type 2 diabetes (including in those of advanced age, who are overweight or obese, and with a family history of type 2 diabetes) in adults is recommended by the U.S. Preventive Services Task Force (2). The occurrence of diabetes is rising in China, where the prevalence of diabetes rose from 2.5% in 1994 to 9.7–11.6% in 2014. We hypothesized that there is a substantial prevalence of hyperglycemia (diabetes and prediabetes), with regional differences, in preconceptional women in China. To address this hypothesis, we analyzed data from the National Free Preconception Health Examination Project (NFPHEP) to quantify hyperglycemia among women with conception intention in China and to determine a more appropriate, tailored screening strategy in this population.

A population-based, cross-sectional, fasting plasma glucose (FPG) survey of

the hyperglycemia rate and its distribution among women planning pregnancy was performed using NFPHEP data, covering 31 provinces in mainland China between 2010 and 2012. Data from 2,094,297 FPG records in 2,120,131 women (age 20–49 years) were analyzed; 1.4% and 12.9% of women had diabetes (FPG  $\geq 7.0$  mmol/L) and prediabetes (FPG 5.6–6.9 mmol/L), respectively, of whom, 7.2% and 1.0% were overweight (BMI 25–29.9 kg/m<sup>2</sup>) and obese (BMI  $\geq 30$  kg/m<sup>2</sup>), respectively. The ratio of self-reported diagnosed diabetes among all identified women was 1.53% (417/27,278), and 80.0% of women with hyperglycemia were without listed risk factors (age  $\geq 35$  years, overweight/obese, multiparity). The prevalence of diabetes and prediabetes within China varied regionally, ranging from 0.1–3.0% and 6.5–24.0%, respectively. After adjustment for risk factors (age, BMI, and parity), the highest and lowest risks were found in Jilin (odds ratio 2.38, 95% CI 2.32–2.45) and Qinghai (0.50, 0.46–0.54), respectively, compared with the median province (Jiangsu) (Fig. 1).

This is a large-scale nationwide public welfare-based study that concerned the

seroepidemiology of preconception hyperglycemia, covered all provinces in the Chinese mainland, enrolled more than 2.2 million Chinese women, and had less than 6% missing data. We reported on the prevalence of hyperglycemia before pregnancy among women with pregnancy intention throughout China for the first time. The low self-report rate provided further evidence that diabetes health care needs improvement in China, especially in rural areas. Also, a routine FPG screening for hyperglycemia is suggested as part of preconception health examinations for all women based on the fact that that only 20% of women with hyperglycemia could be identified based on at least one risk factor (advanced age, being overweight or obese, or multiparity). Moreover, after adjusting for age, BMI, and parity, significant regional differences existed among Chinese women planning pregnancy, with the risk of hyperglycemia in Jilin, Fujian, and Jiangxi provinces being more than twofold higher compared with that in Jiangsu province, whereas that in Qinghai was only half of the risk in Jiangsu. Societal determinants, which are considered to be related to the risk of diabetes in China, could explain these regional differences, with possible

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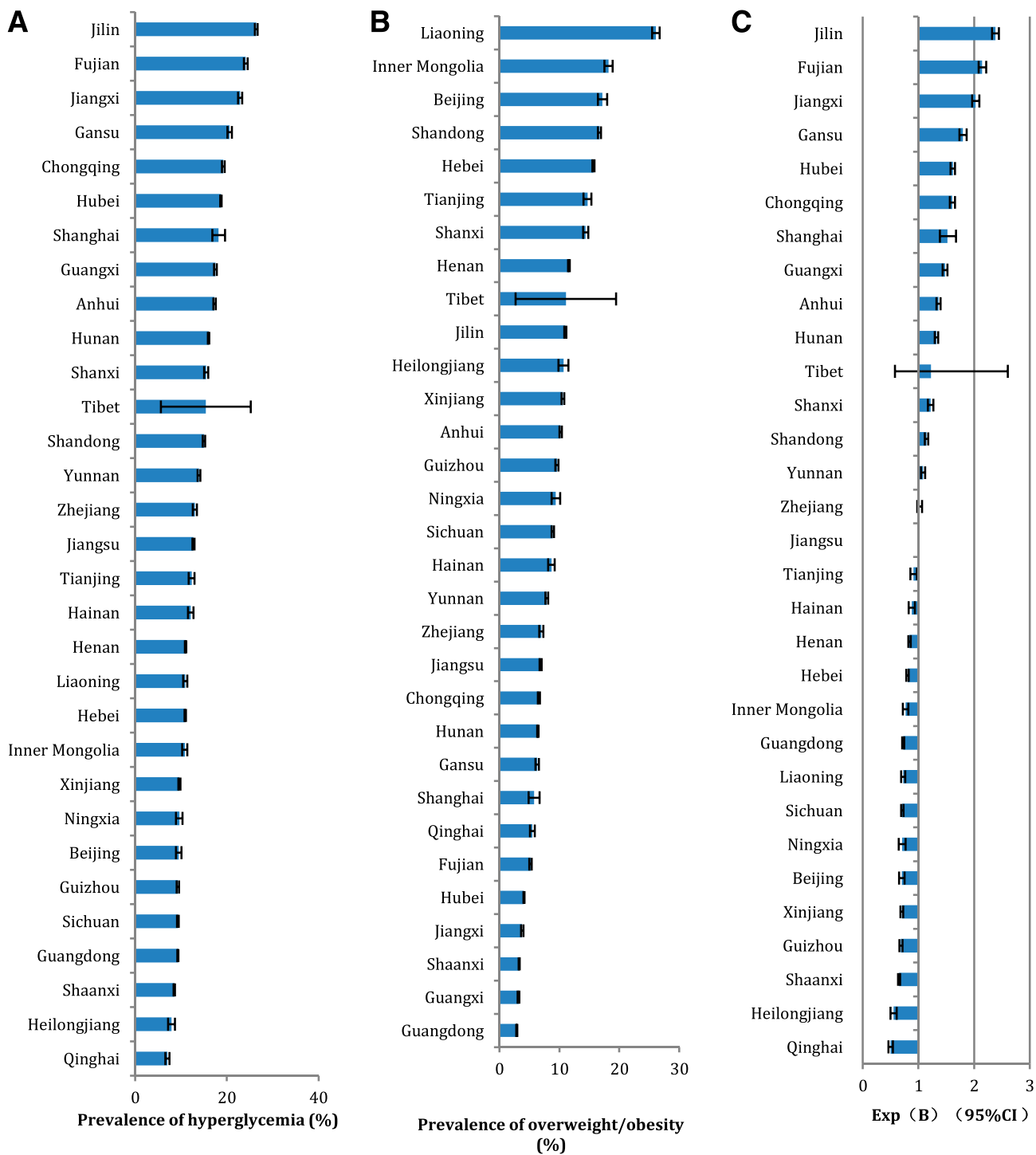
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**Figure 1**—A: Rank of hyperglycemia prevalence (diabetes and prediabetes) among women before conception in all 31 provinces of mainland China. B: Rank of overweight and obese prevalence among women before conception in all 31 provinces of mainland China. C: Interprovincial odds ratios (95% CI) for hyperglycemia adjusted for BMI, age, and parity, with Jiangsu as the reference.

reasons including the imbalanced economic development and urbanization in different regions within China, together with reduced physical activity and changes in nutritional intake (3,4). Poor nutrition in utero and during early life, combined with overnutrition in later

life, may contribute to the accelerated epidemic of diabetes (5); in turn, this might explain, at least partly, the regional differences in the prevalence of hyperglycemia among these women who grew up in areas of imbalanced regional economy over the past three

decades. In summary, the considerable hyperglycemia prevalence and regional variations among Chinese women with conception intention identified herein warrant more attention. A routine preconception hyperglycemia screening strategy for all women is suggested

instead of the current risk factor–based screening approach.

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