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High Prevalence of Diabetes and Impaired Fasting Glucose Among Chinese Immigrants in New York City

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Abstract

Asians have an increased susceptibility to type 2 diabetes, despite relatively low prevalence of obesity in this population. Asian American is a diverse population and there are yet limited data on the prevalence of diabetes among different Asian subgroups and existing studies are limited by small sample size. Hence, we conducted a cross-sectional survey to estimate the prevalence of diabetes and impaired fasting glucose (IFG) in this population among Chinese Americans, the largest Asian subgroup in the US. Our study population consisted 2,071 individuals (52.8% women; mean age: 52.7 ± 13.8 years and mean body mass index (BMI): 23.9 ± 3.2 kg/m²) living in New York City. Data on sociodemographic factors, anthropometric measurements and medical history is obtained during a 1 day clinic visit. In addition, a fasting blood sample was collected to perform measurements on plasma glucose and lipids. Diabetes was defined as self-reported treatment or a fasting glucose ≥ 126 mg/dl and IFG was defined as fasting glucose of 100–125 mg/dl. The age-adjusted prevalence of diabetes in this population was 8.6% and that of IFG was 34.6%. The prevalence of IFG/diabetes was high (38.3%) even among those with low BMI by Asian standards (<23.0 kg/m²) and showed a linear increasing trend with increasing waist circumference. These data suggest a high prevalence of impaired glucose regulation in Chinese immigrants even among individuals with normal BMI. Future studies should focus on evaluating the mechanisms of increased susceptibility of IFG and diabetes in this population.

Keywords

Diabetes; Impaired fasting glucose; Asian; Chinese

Introduction

Although the racial/ethnic disparities associated with type 2 diabetes in the US are well known, there are limited data on the prevalence of diabetes among Asian Americans and its subgroups [1]. Asians living in Asia as well as the Asian diaspora living in other parts of the world, are at an elevated risk of diabetes despite low prevalence of obesity (defined by western standards of BMI ≥ 30.0 kg/m²) in this population [2,3]. The US Asian population has increased from 3.5 million in 1980 to over 15.2 million in the year 2007 [4]. However, there are yet limited national data on diabetes prevalence among Asians. In addition, the small sample size of Asians in existing national surveys may not reliably estimate the diabetes prevalence. Furthermore, the Asian American population is diverse in terms of

national origin, as well as the cultural, dietary, and lifestyle factors that are important determinants of diabetes risk, suggesting the need for separate evaluation of diabetes risk in different subgroups.

Currently, 10% of New York City (NYC) population, almost one million individuals, is Asian American and this number will continue to rise in the next decade [5]. The annual telephone survey conducted in NYC, the Community Health Survey (CHS), relies on self-reports on diabetes and is also limited by small sample size for Asians [6]. Results from the 2004 New York City Health and Nutrition Examination Survey (NYC HANES) which consisted of a clinic visit and collection of fasting blood sample, indicated that among all racial/ethnic groups, Asians had the highest prevalence of diabetes (16.1%) and impaired fasting glucose (IFG; 32.4%) [7]. However, this study was also limited by small sample size of Asian subgroup ($n = 160$) which also precludes estimation of prevalences in different Asian subgroups. The Chinese American community is the largest Asian subgroup living in the US (22.4%) and also the largest Asian subgroup in New York City (45%) [8] and there are limited data on prevalence of diabetes in this subgroup. Hence, we conducted a study to evaluate the prevalence of IFG and diabetes in our ongoing survey among Chinese immigrants in New York City.

Methods

We conducted an analysis using data from our existing cross-sectional epidemiological survey among 2,071 immigrant Chinese Americans living in New York City. Data on sociodemographic factors, anthropometric measurements and medical history were obtained during a 1 day clinic visit. In addition, a fasting blood sample is collected to measure plasma glucose and lipids. Diabetes was defined as self-reported treatment for diabetes or fasting glucose ≥ 126 mg/dl and IFG was defined as fasting glucose of 100–125 mg/dl. Age standardized prevalence estimates were calculated using US population of year 2000 as the standard population. The P -trend for prevalence of IFG/diabetes across categories of waist circumference was estimated using Wald's test in a logistic regression model. All analysis was conducted in SAS ® (Cary, NC) and P -values of <0.05 were considered to be statistically significant.

Results and Discussion

The mean age of the study population was 52.7 (± 13.8) years with 53.7% women and median duration of stay in the US of 11 years. As shown in Table 1, obesity defined by Asian standards (BMI ≥ 27.0 kg/m²) [9] was observed among 16.1% while abdominal obesity (waist circumference >80 cm in women and >90 in men) was prevalent among 42.9% of this population. It is to be noted that these two obesity prevalence estimates would be much lower had we used cut-off values commonly used for western populations (3.6 and 11.7%, respectively). Further, we found that the age-standardized prevalence estimates were 8.6% for diabetes and 34.5% for IFG. The age-specific prevalence (%) of diabetes or IFG were 25.8, 39.1, 55.9, 64.8, 69.1 among those who were <40 , 40–49, 50–59, 60–69 and ≥ 70 years, respectively (P -trend: <0.0001) and the gender specific prevalence estimates were 61.4% among men and 40.4% among women (P -value <0.0001).

As expected, the prevalence of IFG/DM was higher among those with high BMI compared to those with low BMI (58.3 vs. 38.3%; P -value: <0.0001 ; Table 2). Importantly, however, the prevalence of IFG/diabetes was high even in the low BMI group and increasing waist circumference was associated with increased prevalence, with more than 50% prevalence among those with low BMI who were in the highest quartile of waist.

Obesity is thought to be more detrimental in terms of metabolic risk among Asians compared to other ethnic groups [10]. For example, a study demonstrated that for any given level of BMI, Asians have higher plasma glucose and glycosylated hemoglobin (HbA1c) compared to whites [11] and for a given percent body fat, Asians have a BMI that is 3–4 kg/m² lower than in whites [12]. In addition, compared to whites, Asians have higher visceral or intra-abdominal fat [13–16]. Our results in line with this evidence supporting higher susceptibility for diabetes among Asians.

Overall, these data suggest a high prevalence of impaired glucose regulation among Chinese Americans, including among those with low BMI and waist circumference. The limitations of our study are its cross-sectional design and the use of convenience sample. Future studies should focus on evaluating the mechanisms of increased susceptibility of IFG and diabetes in this population.

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Table 1

Distribution of anthropometric factors

	All (n = 2,071)	Men (n = 978)	Women (n = 1,093)
Body mass index (kg/m ²)			
Mean ± SD	23.9 ± 3.2	24.6 ± 3.2	23.4 ± 3.2
<18.5, %	3.0	2.4	3.5
18.5–22.9, %	36.2	27.6	43.8
23.0–24.9, %	24.9	26.4	23.5
25.0–26.9, %	20.0	24.0	16.2
27.0–29.9, %	12.5	15.2	10.1
≥30.0, %	3.6	4.4	2.9
Waist circumference (cm)			
Mean ± SD	83.6 ± 12.4	86.6 ± 12.6	80.9 ± 11.5
>90 (women); >102 (men), %	11.7	3.5	19.0
>80 (women); >90 (men), %	42.9	31.7	52.9

Table 2

Prevalence of IFG/DM by tertiles of waist circumference

	By quartiles of waist circumference				P-trend*	
	Q1	Q2	Q3	Q4		
All	50.3	33.9	42.4	57.2	67.8	<0.0001
Low BMI (<23.0 kg/m ²) (n = 831)	38.3	28.1	34.8	39.0	52.4	0.03
High BMI (≥23.0 kg/m ²) (n = 1,240)	58.3	43.6	54.0	63.3	71.5	<0.0001

* P-trend was derived from logistic regression model and is adjusted for age and gender