

## OBSERVATIONS

## Dietary Acculturation, Obesity, and Diabetes Among Chinese Immigrants in New York City

Only limited data are available regarding East Asians, one of the fastest growing immigrant populations in the U.S. (1–4). We conducted a cross-sectional study of the association between sociodemographic factors, Western acculturation, BMI, physical activity, and fasting glucose among Chinese immigrants attending free cardiovascular risk screening at a New York City community health center.

We obtained randomly selected venous samples from 300 of a total of 622 self-identified Chinese participants, age 18 years or older. Sociodemographic details and time since immigration were obtained. Dietary acculturation was measured using a previously validated scale relying on self-recalled consumption of Western and Chinese foods (5). Cronbach  $\alpha$  was 0.747 for the Western and 0.338 for the Chinese scale. Age was categorized as  $\leq 39$ , 40–55, and  $> 55$  years old. Physical activity was assessed using the International Physical Activity Questionnaire (IPAQ) short form. Analyses included only those with plasma sample and without previous history of diabetes ( $n = 274$ ). No significant differences in sociodemographic, anthropomorphic, or cultural characteristics existed between those included and excluded in the analyses ( $P > 0.05$ ). Relationships between Western acculturation and other variables were assessed using ANOVA and post hoc Duncan multiple range tests.

Participants' mean age was  $50.5 \pm 10.43$  years. The majority (62.0%) were female. Almost half were from mainland

China (47.8%), but a large minority (34.7%) were from Malaysia. Mean time since immigration was 13.6 years (range 1–50 years). Most (81.5%) had been in the U.S. for more than 5 years and 44.2% were older than 40 upon arrival. More than one quarter (28.8%) had impaired fasting glucose and 1.5% had newly diagnosed diabetes ( $> 126$  mg/dl). Mean Western and Chinese dietary scores were  $0.60 \pm 0.26$  and  $0.73 \pm 0.24$ , respectively.

Participants with higher Western dietary acculturation were younger, more educated, had spent a greater percentage of life in the U.S., and were younger at immigration (all  $P < 0.05$ ). Participants spending a lower percentage of life in U.S. had lower Chinese dietary scores ( $P < 0.01$ ).

In univariate analyses, middle age and male sex were associated with higher BMI ( $\beta = 1.67$  and  $1.31$ , respectively,  $P < 0.05$ ). The two older age-groups, male sex, and BMI were associated with higher glucose ( $\beta = 5.74$ ,  $7.64$ ,  $4.66$ , and  $1.06$ , respectively,  $P < 0.01$ ). Western dietary acculturation was negatively associated with fasting glucose ( $\beta = -5.94$ ,  $P < 0.01$ ).

In multivariate linear analyses that included age, sex, education, and Western acculturation, older age-groups and male sex were associated with higher BMI ( $\beta = 1.89$ ,  $1.58$ , and  $1.28$ , respectively,  $P < 0.05$ ). However, only middle age remained significant when physical activity was included ( $\beta = 1.94$ ,  $P < 0.05$ ).

In similar analyses for glucose with additional adjustment for BMI, male sex and BMI were significantly associated with higher fasting glucose ( $\beta = 3.72$  and  $0.98$ , respectively,  $P < 0.05$ ). Western dietary acculturation was negatively associated with fasting glucose ( $\beta = -5.27$ ,  $P < 0.01$ ). After physical activity was included, only BMI and Western dietary acculturation retained their respective associations ( $\beta = 1.19$  and  $-7.16$ , respectively,  $P < 0.01$ ).

Adoption of Western diet may not predispose to obesity or dysglycemia. BMI was the strongest positive risk factor

of dysglycemia. Interventions targeting weight maintenance and physical activity, rather than specific dietary practices may be most effective in preventing diabetes among Chinese immigrants.

ADY OSTER, MD  
JANETTE YUNG, MS

From the Charles B. Wang Community Health Center, New York, New York.

Corresponding author: Ady Oster, aoster@cbwchc.org.

DOI: 10.2337/dc09-2291

© 2010 by the American Diabetes Association.

Readers may use this article as long as the work is properly cited, the use is educational and not for profit, and the work is not altered. See <http://creativecommons.org/licenses/by-nc-nd/3.0/> for details.

**Acknowledgments**— This study is funded by the Board of Directors of the Sergei S. Zlinkoff Fund for Medical Research and Education.

No potential conflicts of interest relevant to this article were reported.

### References

- McNeely MJ, Boyko EJ. Type 2 diabetes prevalence in Asian Americans: results of a national health survey. *Diabetes Care* 2004;27:66–69
- Kandula NR, Diez-Roux AV, Chan C, Daviglus ML, Jackson SA, Ni H, Schreiner PJ. Association of acculturation levels and prevalence of diabetes in the multi-ethnic study of atherosclerosis (MESA). *Diabetes Care* 2008;31:1621–1628
- Burchfiel CM, Curb JD, Rodriguez BL, Yano K, Hwang LJ, Fong KO, Marcus EB. Incidence and predictors of diabetes in Japanese-American men. The Honolulu Heart Program. *Ann Epidemiol* 1995; 5:33–43
- Yang EJ, Chung HK, Kim WY, Bianchi L, Song WO. Chronic diseases and dietary changes in relation to Korean Americans' length of residence in the United States. *J Am Diet Assoc* 2007;107:942–950
- Satia JA, Patterson RE, Kristal AR, Hislop TG, Yasui Y, Taylor VM. Development of scales to measure dietary acculturation among Chinese-Americans and Chinese-Canadians. *J Am Diet Assoc* 2001;101: 548–553