The Metabolic Syndrome in Uygur and Kazak Populations

Weili Yan, PhD
Xiaoyan Yang, MD
Yujian Zheng, PhD
Dongliang Ge, PhD
Yuanming Zhang, PhD

Zimei Shan, BS
Ha Simu, MD
Muslin Sukerobai, MD
Ren Wang, MD

Dongliang Ge, PhD
The Georgia Prevention Institute, Medical University, Urumqi, Xinjiang Uygur Autonomous Region, China; the 2Department of Hypertension, First Affiliate Hospital of Xinjiang Medical University, Urumqi, Xinjiang Uygur Autonomous Region, China; 3Department of Hypertension, First Affiliate Hospital of Xinjiang Medical University, Urumqi, Xinjiang Uygur Autonomous Region, China; 4Cele County Hospital, Hetian, Xinjiang Uygur Autonomous Region, China; and 5Kazak Hospital, Aletai, Xinjiang Uygur Autonomous Region, China.

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Address correspondence and reprint requests to Weili Yan, PhD, School of Public Health, Xinjiang Medical University, 8 Xinyi Rd., Urumqi 830054, Xinjiang Uygur Autonomous Region, China. E-mail: yanweili01@yahoo.com.cn.

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Abbreviations: WHR, waist-to-hip ratio.

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Metabolic Syndrome/Insulin Resistance Syndrome/Pre-Diabetes

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The metabolic syndrome, which has been defined as a clustering of insulin resistance, hypertension, and dyslipidemia (1–4), has become a major public health issue worldwide. Previous studies have shown that the prevalence of hypertension and diabetes was significantly different between the Uygur and Kazak populations, the two major minorities in Xinjiang (5,6). The current study aims to evaluate and compare the epidemiological and clinical features of the metabolic syndrome in the Uygur and Kazak ethnic populations.

RESEARCH DESIGN AND METHODS — In total, 3,015 Uygur (1,301 males and 1,714 females) and 5,617 Kazak subjects (1,301 males and 716 females) from rural south Xinjiang and 1,281 Kazak subjects (499 males and 719 females) from suburban north Xinjiang were randomly enrolled by multistage cluster sampling. A set of questionnaires was completed, including demographic information; details of medical history; family history of hypertension, obesity, type 2 diabetes, and stroke; medication use; and lifestyle information. Three blood pressure measurements and anthropometric measurements including height, weight, and waistline and hip circumference were obtained from each participant by trained and certified observers with standard protocols. Blood glucose was determined after an overnight fast by using a one-touch glucose autoanalyzer (Accu-Chek Advantage II Test Strips; Roche Diagnostics, Mannheim, Germany). Written informed consents were obtained from all study subjects before any data collection and measurements. The International Diabetes Federation definition (4) was adopted to define the metabolic syndrome or its components. All statistical analyses were performed using SAS software (SAS Institute, Cary, NC). Power calculation for generalized linear models was computed using a SAS macro program (available at http://www.sas.com/service/techsup/tnote/tnote_stat.html). P < 0.05 was considered statistically significant.

RESULTS — The metabolic syndrome, which was defined by central obesity, raised blood pressure, and pre-diabetes, was more prevalent in the Uygur than the Kazak population (8.6 vs. 4.8%, P = 0.001). The age-adjusted prevalence of hyperglycemia in the Uygur population was 18 times higher than that in the Kazak population (86.2 vs. 4.7%, P = 0.001). However, the prevalence of raised blood pressure and central obesity in the Kazak population was significantly higher than that in the Uygur population (58.1 vs. 25.2%, P = 0.001 and 48.0 vs. 30.6%, P = 0.001, respectively). To evaluate the effect of obesity on hypertension and diabetes in the Uygur and Kazak populations, the prevalence of hypertension and diabetes was compared by three BMI categories. For BMI <24, 24–28, and ≥28 kg/m², the prevalence of hypertension was 11.39, 29.39, and 51.36% for Uygurs and 27.03, 42.34, and 70.02% for Kazaks. The prevalence of diabetes was 5.19, 6.14, and 12.27% for Uygurs and 0.54, 1.56, and 3.75% for Kazaks, with the P value being 0.0001 for all comparisons of prevalence between the two ethnic groups at the same BMI levels. It showed that with the same BMI level, more Kazak people developed hypertension, whereas more Uygur people developed diabetes. Further comparisons of the abdominal fat between the two populations showed that even with the same BMI levels, Uygur subjects had significantly greater WHR than Kazak subjects for both sexes (0.87 vs. 0.80, 0.93 vs. 0.84, and 0.93 vs. 0.93 for males and 0.85 vs. 0.78, 0.92 vs. 0.82, and 0.94 vs. 0.87 for females, P < 0.05).

CONCLUSIONS — We reported a difference in distributions of the metabolic syndrome among ethnicities that was similar to previous studies. African Americans had a higher age-adjusted prevalence of hypertension, and Mexican-Americans had a higher age-adjusted prevalence of hyperglycemia (7). It is interesting that the different prevalence of hypertension and diabetes in the two ethnic populations with the same BMI levels does not seem to be associated with obesity. Further analysis suggested that even with the same BMI, both Uygur males and females had a significantly greater waist-to-hip ratio (WHR) than Kazak people, which was consistent with the study of Li et al. (8). Numerous studies found that besides environmental factors, WHR was determined by genetic factors in different degrees among ethnic populations (9,10). In African Americans, 59% of variance of WHR in men and 56% of variance in women was attributed to genetic factors (11). More comprehensive studies are expected to elucidate the determinants of the distribution of the metabolic syndrome in Uygur and Kazak populations.
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