



ELSEVIER

ORIGINAL ARTICLE

Differences in the associations of anthropometric measures with insulin resistance and type 2 diabetes mellitus between Korean and US populations: Comparisons of representative nationwide sample data

Yeong Sook Yoon^a, Han Seok Choi^b, Jin Kuk Kim^{c,d},
Yu Il Kim^d, Sang Woo Oh^{d,e,*}

^a Department of Family Medicine, Inje University Ilsan Paik Hospital, Goyang-Si, Gyeonggi-Do, South Korea

^b Division of Endocrinology and Metabolism, Department of Internal Medicine, Dongguk University Ilsan Hospital, Dongguk University College of Medicine, Goyang-Si, Gyeonggi-Do, South Korea

^c Department of Neurosurgery, Seoul Na Eun Hospital, Seoul, South Korea

^d Department of Family Medicine, Center for Obesity, Metabolism and Nutrition, Dongguk University Ilsan Hospital, Dongguk University College of Medicine, Goyang-Si, Gyeonggi-Do, South Korea

^e Channelopathy Research Center, Dongguk University College of Medicine, Goyang-Si, Gyeonggi-Do, South Korea

Received 13 July 2015; received in revised form 15 October 2015; accepted 2 November 2015

KEYWORDS

Ethnic differences;
Body mass index;
Waist circumference;
Insulin resistance;
Type 2 diabetes

Summary

Backgrounds: Variation among ethnic groups in the association between obesity and insulin resistance (IR)/diabetes has been suggested, but studies reported inconsistent results. We evaluated ethnic differences in the association between obesity and insulin resistance (IR)/diabetes.

Abbreviations: AUC-ROC, area under the curve in a receiver operating characteristic curve; BMI, body mass index; HOMA-IR, homeostasis model assessment of insulin resistance; HOMA- β , homeostasis model assessment of β cell function; IR, insulin resistance; NHANES, National Health and Nutrition Examination Survey; WC, waist circumference.

* Corresponding author at: Center for Obesity, Nutrition and Metabolism, Department of Family Medicine, Dongguk University Ilsan Hospital, 27, Dongguk-ro, Ilsandong-gu, Goyang-Si, Gyeonggi-Do 410-773, South Korea. Tel.: +82 31 961 7495; fax: +82 31 961 7496.

E-mail addresses: osw6021@yahoo.co.kr, osw6021@gmail.com (S.W. Oh).

<http://dx.doi.org/10.1016/j.orcp.2015.11.001>

1871-403X/© 2015 Asia Oceania Association for the Study of Obesity. Published by Elsevier Ltd. All rights reserved.

Please cite this article in press as: Yoon YS, et al. Differences in the associations of anthropometric measures with insulin resistance and type 2 diabetes mellitus between Korean and US populations: Comparisons of representative nationwide sample data. *Obes Res Clin Pract* (2015), <http://dx.doi.org/10.1016/j.orcp.2015.11.001>

Methods: We conducted a cross-sectional analysis using Korea ($n = 18,845$) and the USA ($n = 4657$) National Health and Nutrition Examination Survey (NHANES) 2007–2010. We performed statistical comparisons of AUC-ROC (area under the curve in a receiver operating characteristic curve) values for body mass index (BMI), waist circumference (WC) and homeostasis model assessment of insulin resistance (HOMA-IR) to predict IR or diabetes among different ethnic groups.

Results: AUC-ROC values for BMI and WC for predicting IR were highest in Whites (0.8324 and 0.8468) and lowest in Koreans (0.7422 and 0.7367). Whites showed the highest AUC-ROC values for BMI (0.6869) and WC (0.7421) for predicting diabetes, while the AUC-ROC for HOMA-IR was highest in Koreans (0.8861). Linear regression showed significant interactions between ethnicity and the main effects (all $P < 0.0001$). Increases in BMI were associated with a larger increase in HOMA-IR in Whites ($\beta = 0.0719$) and WC in Hispanics ($\beta = 0.0324$), while BMI was associated with a larger increase in fasting glucose in Koreans ($\beta = 0.8279$) and WC in Blacks ($\beta = 0.4037$). In addition, the slope for fasting glucose with increasing HOMA-IR was steeper in Koreans ($\beta = 16.5952$, $P < 0.001$) than in other groups.

Conclusion: The ability of BMI and WC to predict IR and diabetes was highest in Whites, while the ability of HOMA-IR to predict diabetes was highest in Koreans.

© 2015 Asia Oceania Association for the Study of Obesity. Published by Elsevier Ltd. All rights reserved.

Introduction

Type 2 diabetes is an increasing cause of mortality and morbidity in Asians. Epidemiological studies [1–3] documented consistent increases in the prevalence of type 2 diabetes in Asia. Obesity is a key pathogenic contributor to the development of insulin resistance (IR) and type 2 diabetes. Obese individuals tend to be insulin resistant, but the degree of IR appears to differ among ethnic groups, even for the same levels of adiposity [4–8]. South Asians were shown to be more insulin resistant compared with European Caucasians, but East Asians, including Chinese and Japanese populations, were shown to be less insulin resistant compared with European Caucasians and to have a similar level of IR as Blacks. Current evidence suggests that different ethnic groups exhibit substantial differences in IR, even after adjusting for level of obesity [4–8].

It is not clear whether the association of obesity with diabetes is stronger or weaker in Asians than in Caucasians. A multiethnic cohort study of 59,824 subjects living in Ontario, Canada showed that, for the equivalent incidence of diabetes at a body mass index (BMI) of 30 kg/m^2 in White subjects, the BMI was 24 kg/m^2 in South Asians and 25 kg/m^2 in Chinese subjects. The authors concluded that Chinese subjects developed diabetes at a higher rate at lower BMI ranges compared with Caucasians [9]. However, Huxley et al. [10] showed that the

association of diabetes with BMI was weaker in Asians than in Caucasians. Because subjects of different ethnicities (Chinese, Japanese, Korean, Thai and Asian Indian) were pooled in that analysis, the results represent the average of the Asians as a whole and did not consider variability in body size and metabolic characteristics among various Asian ethnic groups [7, 11]. Therefore, the conclusion needs to be confirmed by individual ethnicity comparisons.

Most studies of Asians have focused on Chinese, Japanese, and Asian Indian subjects, and studies for ethnic comparison have been conducted using data from people living in the USA, Canada, and European countries [8]. Scarce data are available for differences between Asians living in Asian countries and other ethnic groups in non-Asian countries. Because obesity, IR, and type 2 diabetes are evoked by the compound effects of genetic influence (e.g. ethnic differences), lifestyle (e.g. eating and physical activity), and environmental factors, comparisons using data from subjects' region of residence are essential for clearer understanding of ethnic differences. In addition, to draw more reliable conclusions from this analysis, each sample should be representative of the target population and measured variables, such as fasting glucose level, insulin level, and anthropometric characteristics, should be directly comparable. However, studies that satisfy these two requirements are scant.

Download English Version:

<https://daneshyari.com/en/article/8674786>

Download Persian Version:

<https://daneshyari.com/article/8674786>

[Daneshyari.com](https://daneshyari.com)