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ORIGINAL ARTICLE

Ethnic and sex-specific cut-off values for adult obesity in the Suriname Health Study

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KEYWORDS

Ethnic differences;
Body-mass index;
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Summary

Background: Sex-specific body mass index (BMI) and waist circumference (WC) cut-off values have been validated for a limited number of ethnic groups. We aimed to derive these cut-off values for Amerindians, Creoles, Hindustani, Javanese, Maroons and Mixed living in Suriname.

Methods: Data from individuals aged 20–65, in the Suriname Health Study was used to derive optimal cut-off values for BMI and WC for the prediction of hypertension (n = 4910) and cardio-metabolic risk (n = 2924). Results from the analysis with Receiver Operating Curves were calculated and compared these with recommended values.

Results: The area under the ROC curve was consistently higher for WC compared to BMI among Creoles, Hindustani, Maroons and Mixed. The BMI cut-off values ranged from 24.8 kg/m² for Creole men and 26.9 kg/m² for Maroon women to 28.4 kg/m² and 30.2 kg/m² for Amerindian men and women, respectively. The WC cut-off values ranged from 80.7 cm for Maroon men, 86.7 cm for Javanese women to 90.8 cm for Hindustani men and 95.7 cm for Amerindian women. Optimal BMI cut-off

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values approximated Asian cut-off values from the World Health Organization whilst those of WC for men approximated and for women exceeded cut-off values from the International Diabetes Federation.

Conclusion: In most ethnic groups, we found better discriminatory power for WC compared to BMI in the relation with cardiovascular risk factors. The estimated BMI and WC cut-off values differed between ethnic groups. Further studies are needed to identify cut-off values related to the future risk of cardiovascular disease and mortality.

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Introduction

Obesity has a growing prevalence worldwide [1–4] and is a major independent predictor of cardiovascular diseases (CVD) [5] and diabetes (DM) [6]. In general, body mass index (BMI) is used to define obesity, whilst waist circumference (WC) is used to define central obesity [7]. Cut-off values for obesity are based on the corresponding risk of cardiovascular and metabolic diseases [8]. An accumulating body of evidence suggests that the relationship of BMI and WC with cardiovascular and metabolic diseases differs between ethnic groups [9–13]. In 2004 the World Health Organization (WHO) expert consultation group recommended the use of country specific BMI cut-off points for public health action [14]. As health risks accumulated at different levels of BMI among populations the consultation group advised additional trigger points as BMI thresholds. Ethnic specific revisions for BMI cut points to define obesity may be warranted, especially to estimate the burden of obesity-related metabolic disorders among non-European populations [15–18]. The International Diabetes Federation (IDF) recommends the use of ethnic specific WC cut-off values [19]. Currently, ethnic sex-specific BMI and WC cut-off values are available only for a limited number of ethnic groups.

The Republic of Suriname, located in the north-east of South America, is an upper-middle income Caribbean country [20]. Suriname has a multi-ethnic population, mainly from Indian, African, Indonesian and Amerindian descent [21]. Cardiovascular disease has been the main cause of mortality for decades in each ethnic group [21]. Also, ethnic specific cut-off values have neither been evaluated nor determined.

We used data from the Suriname Health Study to derive sex and ethnic specific cut-off values of

BMI and WC, corresponding with an increased risk of hypertension and a combined adverse cardio-metabolic profile. We compared our derived BMI and WC cut-off values with those available from WHO and IDF.

Methods

Design

This study was embedded in the Suriname Health Study; the first nationwide study of non-communicable diseases (NCD) risk factors in Suriname designed according to WHO Steps guidelines [22]. As previously described in detail, this study used a stratified multistage cluster sample of households to select respondents between March and September 2013 [22]. Amerindian, Creole, Hindustani, Javanese, Maroon and Mixed respondents were surveyed. All measurements were carried out as described in Part 3 “Training and Practical guides” of the WHO steps manual with the recommended equipment [23]. The Ethics Committee of the Ministry of Health (Commissie mensgebonden wetenschappelijk onderzoek, (VG 004-2013)) approved this study. Of the respondents that consented to be interviewed and have their height, weight and blood pressure measured in the Suriname Health Study 4910 valid records of participants aged 20–65 years were available for the current study. The respondents that also consented to have their blood drawn for biochemical analysis contributed 2924 valid records for the current analysis (Fig. 1). The data were weighted based on selection and non-response for both subgroups separately. The overall weight of the data is the multiplication of the sample design weight, the

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