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ORIGINAL ARTICLE

Lowered cutoff points of obesity indicators are better predictors of hypertension and diabetes mellitus in premenopausal Taiwanese women

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Summary
Introduction: In previous study, we found that in order to prevent MS in women aged <65 years, the cutoff points of obesity indicators should be lowered.
Objective: To investigate whether our proposed cutoff points of obesity indicators predict the occurrence of hypertension (HT), diabetes mellitus (DM), and hyperlipidemia in premenopausal women with greater sensitivity and specificity compared to reference cutoff points of obesity that are currently being used.
Methods: Using the database of the ''2002 Survey on the Prevalence of Hypertension, Hyperglycemia and Hyperlipidemia in Taiwan'' provided by the Bureau of Health Promotion, Taiwan as research material, data from 2270 premenopausal women aged 20—65 years were used for the analyses. The receiver-operating characteristic curves (ROC) of the body-mass index (BMI), waist circumference (WC), waist-to-hip ratio (WHR), and waist-to-height ratio (WHtR) were used to predict HT, DM, and hyperlipidemia.
Results: Obesity is not a good predictor of the occurrence of hyperlipidemia in premenopausal women aged <65 years. However, our proposed cutoff points had greater sensitivity and specificity than did the reference cutoff points. To prevent the risk of

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HT and DM in premenopausal women, the cutoff points of obesity indicators should be reduced. The proposed values are as follows: a WHR of 0.79; a WC of 74.7 cm; a WHtR of 0.49; and a BMI of 22.3 kg/m^2.

Introduction

According to the Nutrition and Health Survey (2005—2008) in Taiwan [1], respective prevalence of being overweight (24 kg/m^2 ≤ body-mass index (BMI) < 27 kg/m^2) in Taiwanese women of young (19—30 years), prime (31—44 years), middle (45—64 years), and old age (>65 years) are 9.8%, 12.1%, 27.6%, and 32%, the percentage of mildly obese women (27 kg/m^2 ≤ BMI < 30 kg/m^2) increased from 7.6% in 1993—1996 to 10.5%. According to a survey by the Bureau of Health Promotion, the prevalence of abdominal obesity (waist circumference (WC) ≥ 80 cm) in Taiwanese women increases with age [2].

Because they are protected by ovarian hormones, premenopausal women have lower prevalences of chronic diseases. It has been demonstrated that, the risks of hypertension (HT), diabetes mellitus (DM), and hyperlipidemia in Taiwanese women aged below 50 years were lower than those of men. However, for women aged >50 years, the risks for HT, DM, and hyperlipidemia were greater than that those for men [2]. Even though premenopausal women are protected by estrogen and since obesity has a significant correlation with chronic diseases, the ever-increasing obesity rate in women may increase the risks for HT, DM, and hyperlipidemia in younger premenopausal women.

It was established that different obesity patterns have different physiological effects. In particular, central obesity is correlated with the occurrence of chronic diseases [3]. Studies showed that the degree of central obesity is inversely correlated with the high-density lipoprotein cholesterol (HDL-C) level, and positively correlated with levels of triglyceride (TG) and insulin resistance, and central obesity leads to a higher degree of hyperlipidemia and insulin resistance [4,5], and each MS components [6]. Since obesity is correlated with chronic diseases, obesity indicators, including the BMI, WC, waist-to-hip ratio (WHR), and waist-to-height ratio (WHtR), are commonly used as predictive markers of chronic diseases. Compared to WC, the BMI is a stronger predictor for the occurrence of CVD in middle-aged women [7], and is an important risk factor of MS in menopausal women [8]. Kulie et al. [9] suggested that if the BMI is >24 kg/m^2 in women, a WHR of >0.76 will increase the risk of DM. Furthermore, the WHR was significantly correlated with the risk of mortality in old-aged women [10]. A study by Esteghamati et al. [11] on 4615 individuals aged >18 years showed that the WHR is the best predictor of cardiovascular risk. The Chinese Taipei Association for the Study of Obesity [12] suggested that women with a WHR of >0.85 were more susceptible to chronic diseases, including CVD, HT, atherosclerosis, DM, and hyperlipidemia. In addition, the WHtR is a better marker for screening cardiometabolic risk factors compared to the WC and BMI [13]. Ashwell and Hsieh [14] suggested that the WHtR has an earlier sensitivity to health indicators compared to the BMI, and that a cutoff point of 0.5 for the WHtR is applicable to different genders and populations.

Currently, every country uses different cutoff points for obesity indicators. The International Diabetes Federation [15] defines obesity depending on ethnicity. For Asian women, central obesity is defined as a WC of ≥80 cm, which is the same as the definition given by the Chinese Taipei Association for the Study of Obesity [12]. However, the Bureau of Health Promotion, Taiwan [16] defines obesity as a WC of >80 cm, and being overweight as a BMI of not less than 24 kg/m^2 and <27 kg/m^2 for women.

The currently used cutoff points for obesity indicators are not tailored for specific age groups. In our previous study [17], we found that obesity was not a good predictor of MS in women aged ≥65 years; however in order to prevent MS in women aged <65 years, the cutoff points of obesity indicators should be lowered. We proposed that to avoid two or more MS components in premenopausal women aged <65 years, their WHtR