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In Search of the Best Candidate for Detection of Metabolically Obese Normal-Weight Phenotype

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Nowadays, it is widely accepted that obese individuals have a worse metabolic profile than their normal weight counterparts. Despite this fact, there is a subgroup of non-obese individuals who represent some metabolic abnormalities such as high visceral adiposity, dyslipidemia, hyper insulinemia, or hypertension (Teixeira et al., 2015). These individuals who are entitled as Metabolically Obese Normal-Weight (MONW), like the obese subjects, have more susceptibility to obesity-associated disorders such as cardiovascular diseases and diabetes mellitus (Aung et al., 2014). The global prevalence of MONW phenotype is estimated at 20 % among adults (Wang et al., 2015). In Iranian population, the prevalence of this phenotype was reported 9.9 % and 11% in adults men and women, respectively (Hadaegh et al., 2007). Also, in the first issue of JNFS, a study by Karandish et al., had nicely addressed the distribution of metabolic abnormalities among Iranian pediatrics with different obesity phenotypes. They reported that 5.4 % of participants were MONW phenotype and had a higher percentage of abnormalities in triglycerides (TG) and high density lipoprotein cholesterol (HDL-c) levels compared to individuals with other obesity phenotypes (Karandish et al., 2016).

Individuals with MONW phenotype are typically not considered at high risk of cardiometabolic disorders due to the normal values of body mass index (BMI). Although, a potential limitation of BMI is the lack of ability to distinguish fat mass, which is generally elevated in MONW subjects, from fat free mass (Wells and Fewtrell, 2006). Therefore, searching for new indices that can cover the limitations of BMI in the identification of MONW phenotype is necessary. Previous reports have shown a positive correlation between body fat percentage and abnormal metabolic profile in individuals with MONW phenotype. They suggested that body fat percentage measured by dual-energy x-ray absorptiometry or bioelectrical impedance analysis is a good indicator of MONW phenotype (Marques-

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Vidal et al., 2010, Shea et al., 2012). While these methods estimate fat mass more precisely than others, they usually have strict procedures to follow which may limit their usefulness for routine screening programs (Wells and Fewtrell, 2006). Recently, a study by Du et al., assessed the predictive value of two new indices including lipid accumulation product (LAP) and visceral adiposity index (VAI) for identification of MONW individuals. A combination of Waist Circumference (WC) and TG values were used to calculate LAP index. While VAI was calculated based on using both metabolic profile (TG and HDL-C) and anthropometric indices (BMI and WC) values. The researchers found a strong correlation between both LAP and VAI with MONW phenotype regardless of different diagnosis criteria of the phenotype (Du et al., 2015) .In addition, Hosseinpanah et al., showed that LAP index was a strong predictor of cardiovascular risk factors among a large group of Iranian adults with normal weight (Hosseinpanah et al., 2016).

Taken together, findings from aforementioned studies can partially answer the question of which index or indices have more ability to detect individuals with MONW phenotype. Due to the novelty of this topic, more researches are demanded especially among children, as it was noted that early-age health conditions can potentially affect the progression of atherosclerotic cardiovascular events during adulthood (Karandish et al., 2016). It is reported that MONW individuals, generally response better to the therapeutic lifestyle changes including dietary modifications and physical activity engagement compared to the obese subjects (Teixeira et al., 2015). Therefore, it is promising that early identification of MONW individuals by using an appropriate method will help health professionals to implement effective interventions at early stages to reduce or prevent from the progression of metabolic disorders among these high risk individuals.

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