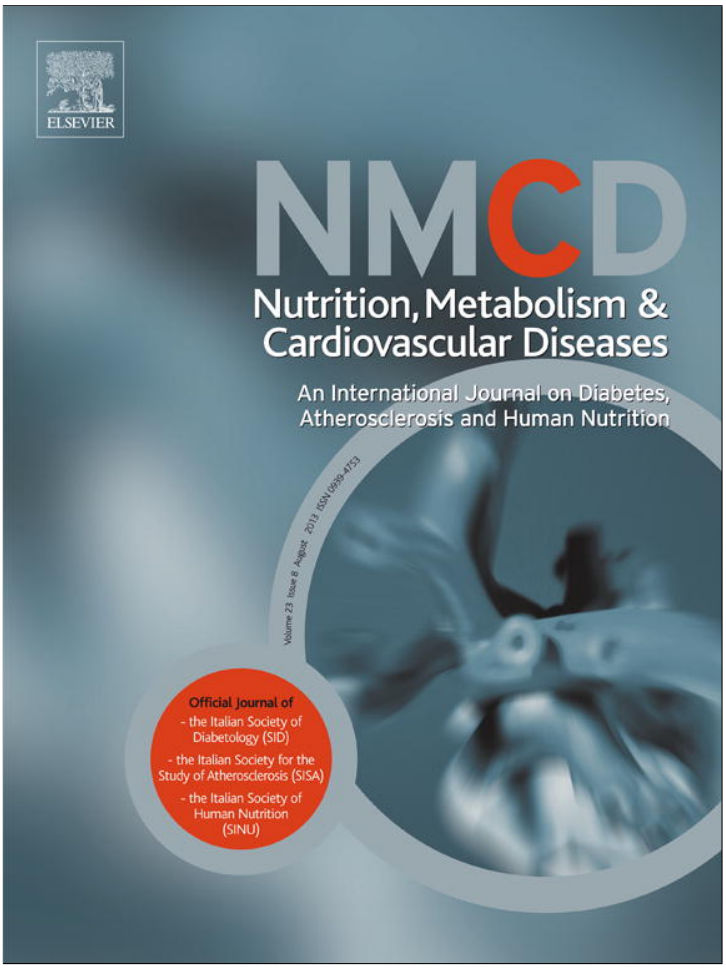

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Nutrition, Metabolism & Cardiovascular Diseases

LETTERS TO THE EDITOR

Clinical indications and proper use of Visceral Adiposity Index

Visceral Adiposity Index (VAI), a gender-specific mathematical index, based on simple anthropometric [BMI and Waist Circumference (WC)] and metabolic parameters [Triglycerides (TG) and HDL Cholesterol (HDL)], is a surrogate marker of adipose tissue function and distribution, independently correlated with insulin sensitivity and cardiometabolic risk in the general population [1]. So far, VAI is an empirical mathematical model that does not originate from theoretical assumptions, but from the observation in a healthy normal/overweight population of a linear relationship between BMI and CV, from which a linear equation has been extrapolated [1]. A Model of Adipose Distribution (MOAD) was created based on this linear equation and then it was corrected for TG and HDL, determining the VAI.

In the last three years, it has been reported in more than 20 publications, in which there was evaluated the capability of the VAI to express the cardiometabolic risk and a possible "adipose tissue dysfunction". The most important results were obtained in populations at metabolic risk without always having an overt Metabolic Syndrome (MetS) (general population [1—4], women with PCOS [5,6], patients with NAFLD [7—12], patients with HCV [13], patients with acromegaly [14,15], patients with prolactinoma [16], patients with diabetes [17,18]). In some populations a specific cut-off was also identified as able to facilitate the early recognition of cardiometabolic risk in patients before they develop overt MetS.

Three of the variables making up the VAI (WC, TG, HDL) being dichotomically expressed in the criteria of MetS, it is also obvious that it is futile to apply the index in patients with overt MetS.

However, certain studies in the same type of patients have yielded conflicting results, and in some cases the

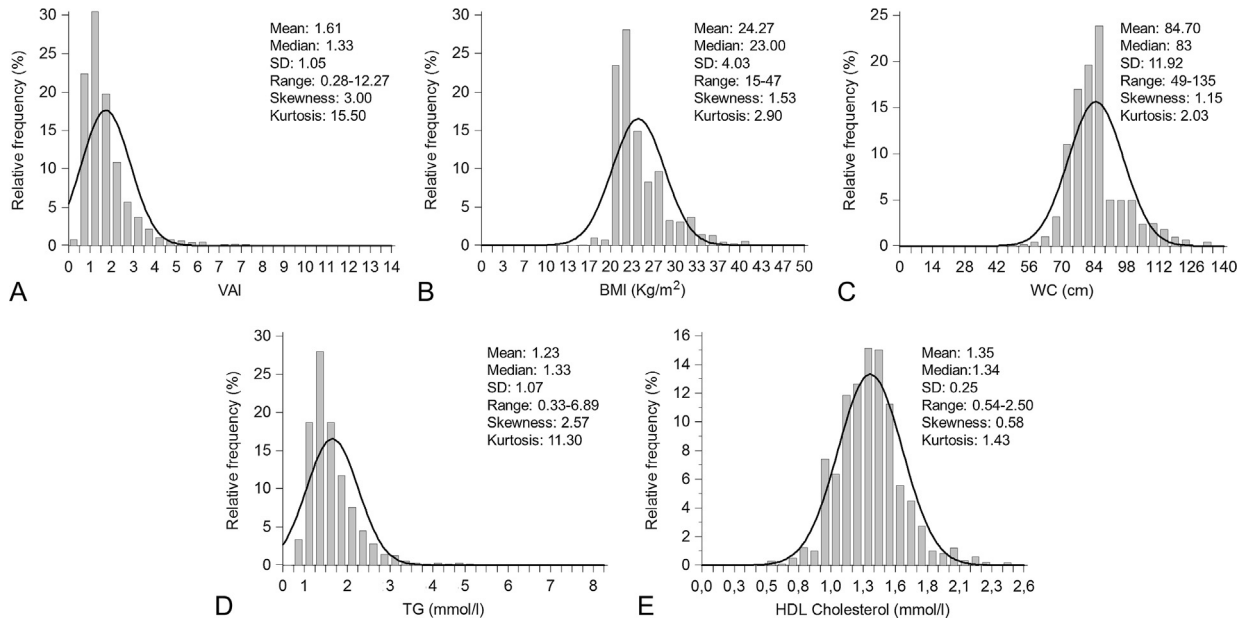

Figure 1 Legend: Distribution of the Visceral Adiposity Index (VAI) (A) and its component variables [BMI (B), Waist Circumferences (C), Triglycerides (D), HDL Cholesterol (E)] in a population of 1764 Primary Care patients.

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predictive power of the VAI has been ascribed to the individual variables in the model (BMI, WC, TG, HDL). We think these discrepancies can be attributed to the extreme variability of some variables in the model (e.g. TG) and to the difficulties of WC assessment in morbid obesity and/or pendulous abdomen. In order to investigate the variability of the VAI and that of its components (BMI, WC, TG, HDL), in the 1764 Primary Care patients studied in a previous study, we retrospectively and cross-sectionally re-examined all data [2]. Although among all the variables examined none showed normal distribution (Kolmogorov–Smirnov test: $p < 0.001$ for all variables), VAI and TG show a greater skewness (VAI: 3.00 ± 0.05; BMI: 1.53 ± 0.05; WC: 1.15 ± 0.05; HDL: 0.58 ± 0.05; TG: 2.57 ± 0.05) and kurtosis (VAI: 15.50 ± 0.11; BMI: 2.90 ± 0.11; WC: 2.03 ± 0.11; HDL: 1.43 ± 0.11; TG: 11.30 ± 0.11) (Fig. 1): the two statistical measures describe the lack of symmetry and the "peakedness" of the curve of distribution, respectively. Therefore, particularly high values of TG [values $>$ 3.15 mmol/l or 279 mg/dl (values equal to the mean+3SD in the 1764 Primary care patients studied)] could affect the validity of VAI. In conclusion, for proper application in an individual patient or in small sample size studies, the application of the VAI is not recommended, in the presence of morbid obesity, pendulous abdomen, severe hypertriglyceridemia and/or or use of fibrates.

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