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DEBATE

Ethnicity-specific cut-offs that predict co-morbidities: the way forward for optimal utility of obesity indicators

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Abstract
Obesity indicators are useful clinical tools in the measurement of obesity, but it is important for clinicians to appropriately interpret their values in individuals with different ethnicities. Future research is needed to identify optimal cut-offs that can predict the occurrence of cardio-metabolic comorbidities in individuals of different ethnic descent. Assessment of more recently developed indicators like the Edmonton Obesity Staging System and visceral adipose tissue are able to appropriately identify metabolically at-risk individuals.

Keywords: Obesity indicators; Normal-weight obesity; Ethnicity specific cut-offs

In agreement with the points raised by Kryst *et al.* (2019b) we recognize the ethnic differences in the body composition among individuals of South Asian origin, which often challenges the clinical utility of conventional obesity indicators in this population. We also acknowledge the paucity of literature in this regard, especially from the Indian subcontinent (Kryst *et al.*, 2019a).

The utility of conventional obesity indicators like body mass index (BMI), waist circumference, hip circumference, waist–hip ratio, waist–height ratio and neck circumference in individuals of different ethnicity can be enhanced by using ethnicity-specific cut-offs for the identification and treatment of at-risk individuals (Yajnik & Yudkin, 2004). Though data are emerging on novel cut-offs for different measures of obesity among different ethnicities, there is a definite need to generate more evidence to study their utility in the primary and secondary prevention of cardio-metabolic disorders, before they can be incorporated into public health practice guidelines (Xin *et al.*, 2012).

More recently, the Canadian Obesity Network (CON) devised a novel obesity scoring system that categorized obese individuals into five stages depending on the presence and severity of the obesity-related co-morbidities (Martinez & Martinez, 2017) – the Edmonton Obesity Staging System (EOSS). Padwal *et al.* (2011) showed that there was a concurrent increase in long-term mortality with increasing stages of EOSS.

The other important point raised by Kryst *et al.* (2019b) is regarding the alarming rise of obesity in young adults, adolescents and children, who are likely to develop metabolic diseases earlier in age, so affecting their fitness, well-being and quality of life in the most productive years of their life. To interpret obesity indicators in this age group, in addition to ethnic differences, it

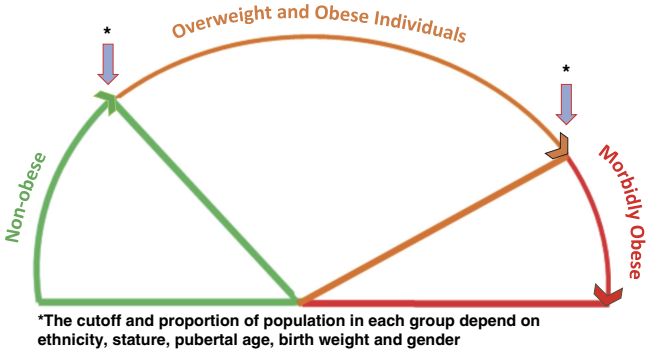

Figure 1. Schema showing the role of obesity indicators in determining the prevalence of obesity in the community.

is important to take into consideration other aspects such as stature, pubertal age, birth weight and sex (Thomas *et al.*, 2012; Baxi *et al.*, 2016). The threshold used for any obesity indicator determined by these factors would also alter the proportion of individuals in each obesity category in the community. This will impact the planning and execution of public health management strategies (Fig. 1).

Further to the response by Kryst *et al.* (2019b) on the role of measuring visceral adipose tissue in obese individuals, its clinical use is shown in Fig. 2. This shows that two individuals with morbid obesity, of similar age and BMI, have different visceral adipose tissue contents as measured by a DXA (Dual-energy X-ray Absorptiometry) scan. These individuals have very distinct metabolic co-morbidities despite an extreme yet comparable BMI, reflecting the

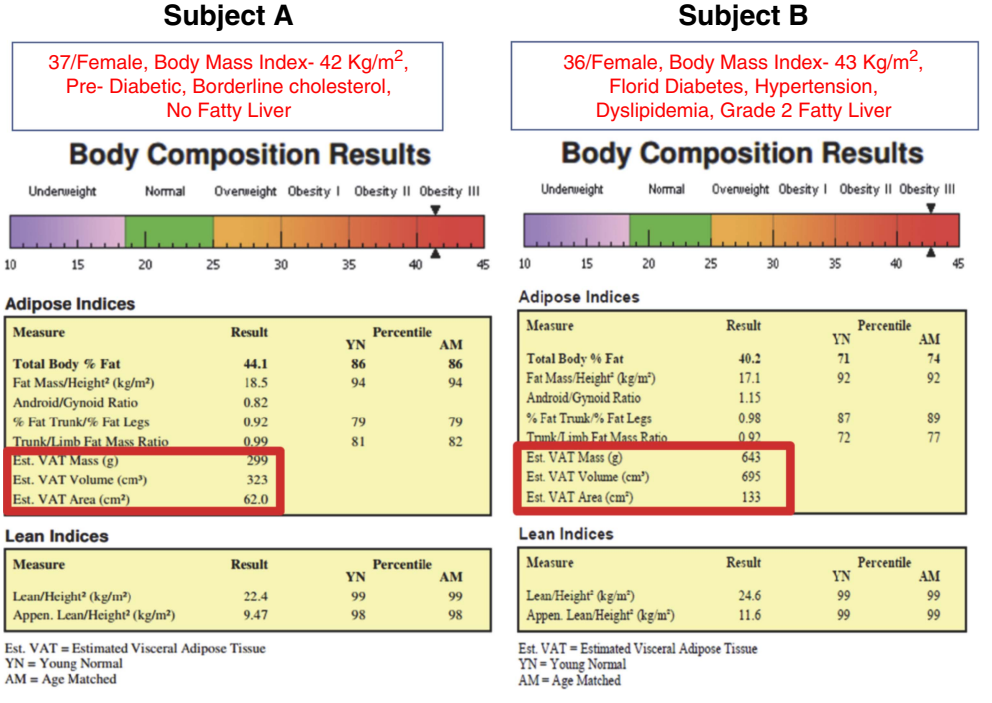

Figure 2. Role of measuring visceral adipose tissue (VAT) in obese individuals. Despite having a similar age, sex and BMI the two subjects depicted in this figure have disparate visceral adipose tissue content and contrasting metabolic phenotypes.

importance of measuring visceral adipose tissue in the screening and follow-up of obese patients (LaForgia *et al.*, 2009). The other upcoming methods of fat estimation include body plethysmography and potassium counter, magnetic resonance imaging and even fat biopsies in some individuals. In the recent past, there has also been an upcoming role of genetic indicators of obesity in the evaluation and management of obesity, especially in highly consanguineous South Asian populations (Kapoor *et al.*, 2019b).

To summarize, the key message from this debate is that even though obesity indicators are useful clinical tools in the measurement of obesity, it is important for clinicians to appropriately interpret their values in individuals of different ethnic origin. Further research is needed to identify optimal cut-offs for these measures that can predict the occurrence of cardio-metabolic co-morbidities in a particular population.

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