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Cardiovascular Risks in Indian Population Could be Linked to Lean Metabolic Syndrome

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There are multiple risk factors for developing Cardiovascular Disease (CVD). However, some risk factors that commonly cluster together such as obesity, dyslipidemia, hypertension and hyperglycemia have been termed as the *Metabolic Syndrome* (MS). Recently the National Cholesterol Education Program's Adult Treatment Panel III report (ATP III) defined the criteria for metabolic syndrome.[1] The selected criteria differ from those of other organizations and therefore, the National Heart, Lung and Blood Institute, in collaboration with the American Heart Association, convened a conference to examine scientific issues related to definition of the metabolic syndrome. ATP III identified six components of the metabolic syndrome that relate to CVD: abdominal obesity, atherogenic dyslipidemia, raised blood pressure, insulin resistance ± glucose intolerance, proinflammatory and prothrombotic states.[1] Though the pathogenesis of the metabolic syndrome is still unclear, two potential etiological categories have been more emphasized: obesity with associated disorders of adipose tissue and disorders due to insulin resistance.

Recently metabolic syndrome is found to be common in rural parts of India due to high prevalence of diabetes inspite of the fact that obesity is not prevalent in rural population, especially among the underprivileged population.[2] The prevalence of metabolic syndrome is about 30% in India, which is quite high as compared to other south-east Asian nations.[3] Originally, the idea of defining MS was to categorize the risk factors for developing CVD, with the objective of early intervention and prevention. Initially, the criteria for MS were based on risk prediction in western population and risk stratification was not done for Asian populations. National Cholesterol Education Program Adult Treatment Panel III recommended that three of five criteria should be present to define MS. But, International Diabetes Federation (IDF) definition of MS included abdominal obesity as an obligatory criterion along with at least two other criteria. However, the recent report of Mukhopadhyay *et al.* that "Lean metabolic syndrome: A concept or a reality?"[4] suggested that even the current IDF Asian Indian cut-offs of Waist Circumference (WC) may not be a sensitive indicator for predicting the risk of metabolic disorders in all segments of our population. The cut-off value of Waist Circumference (WC) for diagnosis of abdominal obesity was based on data obtained from white Caucasians. However, it was later detected that these cut-off values of WC were low even in some Caucasian population when correlated with their individual CV risk factors.[5] Misra *et al.* demonstrated that WC cutoff values in Asian Indians for determination CV risks are much lower. WC of 72 cm in women (Sensitivity: 68.7%, specificity: 71.8%) and 78 cm in men (Sensitivity: 74.3%, specificity: 68.0%) with BMI levels >23 kg/m^2 were observed to be optimum for noticing the CV risks.[6] Vikram *et al.* observed that in non-obese individuals (BMI <25 kg/m ^{2}) with WC 70–80 cm, men had significantly high prevalence of hypertriglyceridemia and women had prevalence of hypertriglyceridemia and hypertension, predisposing them to higher CV risks.[7]

Thus, high CV risk factors were attributed in large extent to body composition of the Asian Indians at lower WC levels as compared to Caucasians. This was mainly attributed to the fact that less skeletal muscle mass and pelvic skeleton dimensions are seen in Asians, which was proposed to be mainly due to childhood malnutrition that could have affected the WC.[8] Hence, lower WC in Indians does not preclude them from higher CV risks due to the so-called "trim-looking Asian Indian" appearance, which has more proportion of visceral fat content as compared to the subcutaneous fat. Thus, though central obesity remains one of the major constituents in the definition of MS, in Indian population, especially in rural parts of India, external body adiposity is thought to have lesser role, as MS is observed quite commonly in non-obese mass and CVD is also common in these populations.[9] The population in the underprivileged section of the Indian society is also not commonly obese because of poor socio-economic status and they also do significant exercise through their daily activities. But, diabetes, hypertension and CVD are not less common in these populations, In India, significant proportions of persons with diabetes are lean. At the same time, lean Nonalcoholic Fatty Liver (NAFL) is now a recognized entity, especially in rural areas and NAFL is a known risk factor for diabetes and its complication.[10] Thus, if a lean person with the presence of all criteria for MS will be having a high risk for developing diabetes or CAD, yet will not be categorized as MS by IDF criteria, thereby demeaning the importance of MS as a CV risk factor. Although international bodies have recognized central adiposity as a major component of MS, it is high

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time to introspect the MS criteria of individuals below the current cut-off values of WC. But recent studies suggest that metabolic disorders are highly prevalent in lean and trim individuals, especially in Indian population.[8] Emerging literature also propose that an abnormal metabolic profile, rather than elevated WC, is linked with higher risk of diabetes and CVD.[10] Moreover, psychological and physical stress, wrong eating habits and junk foods, sedentary life and heredity contribute significantly to CV risks in addition to obesity.[2] Thus, nonobese individuals with other criteria are at higher risk of developing CVD. Hence, the screening programme for identifying risks in Indian population should address the lifestyle and body composition assessment in addition to WC and BMI measurement to prevent the growing risk of developing CVD.

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