
Editorial

Definition and Etiology of Metabolic Syndrome

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Obesity and the metabolic syndrome have been known for a long time as major contributors to the risk of cardiovascular diseases and diabetes in adults. The prevalence of both conditions has been increasing in most parts of the world, probably due to urbanization and changes in life style. In U.S., for example, from 1988 – 1994 to 1999 – 2000, the metabolic syndrome increased by 23.5% in women and 2.2% in men.¹ It has been estimated that 1.1 – 1.7 billion people worldwide are overweight and around 312 million of them are obese.² Obesity is a major health challenge both in developing and developed countries. The prevalence of obesity has tripled in developing countries in the past 20 years, presumably due to adoption of a Western lifestyle. Obesity and the metabolic syndrome also impose a great burden on the health systems of developing countries.³

Since the process of atherosclerosis starts in childhood, obesity and metabolic syndrome must be taken seriously in children and adolescents. The definition of metabolic syndrome in children and adolescents poses two challenges.⁴ Firstly, while in adults several lines of evidence shown an increased risk of unfavorable outcome with metabolic syndrome, there are very few outcome data in children. The second challenge is caused by the problems arising from “transposing a single definition to children and adolescents”⁴; all components of adult metabolic syndrome change with age and puberty, in particular has a large impact on them. Despite these facts, many studies have shown an increasing prevalence of this syndrome in children.

A recent review showed that the highest prevalence of overweight in children has been reported in Eastern Europe and the Middle East.⁵ The prevalence of the metabolic syndrome among the youth was also found to be high in a few studies conducted in developing countries. In Iran,

high prevalences for childhood obesity and metabolic syndrome have been reported. In different surveys, 4 – 8% of children have been reported to be obese⁶, and about 10% to have the metabolic syndrome.⁵ In this issue of Archives of Iranian Medicine, a study on the overweight adolescents, reports that 26.6% of them had the metabolic syndrome, and high triglycerides was the most common component of the syndrome in this group.⁷ In this study, Moayeri and colleagues have used adult metabolic syndrome definitions modified for age by Cook et al.⁸ As mentioned before, the definition of the metabolic syndrome in children and adolescents is not very straightforward, and it is not clear how much this definition predicts outcome, but it seems it is associated with insulin resistance in children.⁹ The study does not compare these findings with normal children, but the figure itself implies that the prevalence is higher than those reported in general population of adolescents. A previous study in Tehran had shown this by observing that the prevalence of metabolic syndrome in overweight adolescents, compared with those at risk for overweight and those with normal weight was 42% versus 13.3% and 4%, respectively.¹⁰

Environment seems to play an important role in the etiology of the metabolic syndrome, and the role of unhealthy diet and physical inactivity has been studied extensively.¹¹ Several candidate genes have also been shown to be involved in metabolic syndrome, including the angiotensin-converting enzyme (ACE) gene polymorphism. Nikzami et al¹² have studied the association of ACE gene polymorphism with the metabolic syndrome in 170 diabetic patients and 91 controls. They studied an insertion (I) or deletion (D) of a 287-bp fragment in the 16th intron of this gene. This polymorphism has been shown to be related to a number of conditions such as diabetes mellitus (DM),¹³ hypertension,¹⁴ and coronary artery disease.¹⁵ In this study, while patients with diabetes had significantly higher prevalence of DD genotype (which is associated with higher level of plasma

ACE) and the D allele compared with the control group, the presence of the metabolic syndrome was not associated with this polymorphism.

Evidence suggests the correlation between insulin resistance, abdominal obesity and the metabolic syndrome.¹⁶ No matter what definition we use for the clinical presentation of insulin resistance, it is clear that it predisposes individuals to many life-threatening conditions such as diabetes, cardiovascular diseases, and non-alcoholic fatty liver disease. What adds to the importance of insulin resistance and obesity, is their high prevalence which signifies them as a public health problem. Body weight reduction and physical activity are the key strategies to overcome this public health problem and its consequences.

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