Editorial

Metabolic Syndrome in Children and Adolescents

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Cardiovascular diseases and metabolic syndrome in underdeveloped countries

Cardiovascular diseases represent the first cause of death in
developed countries, but their importance in underdeveloped ones
and in those with a transitional economy has increased1. As re-
 sponsible, a set of risk factors, identified as metabolic syndrome,
represented by arterial hypertension, overweight/obesity, elevated
levels of triglycerides, reduced levels of HDL-cholesterol, and in-
tolerance to glucose/type 2 diabetes are rapidly evolving2-4. The
way such association leads to coronary arteriosclerosis, which
accounts for the great majority of the deaths in affected individuals,
has not yet been clearly understood. However, one of the important
factors is the presence of insulin resistance/hiperinsulinemia, is
frequently identified in a cluster in affected individuals. The latter
seems to play an important role in the pathophysiology through
the activation of the sympathetic nervous system and sodium
retention, in addition to stimulation of cell growth. Obesity/hipe-
rinsulinemia seem to be the driving forces related to multiple risk
factors and the development of cardiovascular diseases 3,4.

The root of the problem is a high risk factor
profile and metabolic syndrome in children
and adolescents

The presence of cardiovascular risk factors in the adult pop-
ulation is a common fact in clinical practice. However, over the
last 20 years, this same association has been demonstrated in
the young population and is also related to a parental history of
the syndrome5-8. In children and adolescents, the initial alterations
in each of such factors may occur in varied associations, which,
even being small, ultimately determine an unfavorable cardiovascular
profile for those young individuals. Bogalusa carried out a study
with 4,522 individuals, whose ages ranged from 5 to 38 years,
selected between 1988 and 1996, to assess the components of
the metabolic syndrome (fat index; serum insulin, glucose, trigly-
cericide and HDL-C levels; and BP). The author suggested two
independent models to explain the cause of the syndrome. One of
the models included fat index and insulin, lipid, and glucose levels,
and the other included only insulin levels and blood pressure. The
two models explained 54.6% of the total variance in the sample,
suggesting a link between the metabolic alteration and the he-
modynamic factor, whose common substrate was hyperinsulinemia/
insulin resistance8. Those same clinical alterations could cause
the early atherosclerotic lesions at autopsia observed in those
populations9-11.

In Brazil, the Study of Rio de Janeiro, initiated in 1983, was
designed to determine the blood pressure curve in 7,015 young
individuals aged from 6 to 15 years, stratified by sex and socioe-
omic level, and evolved to the search of the aggregation of
other cardiovascular risk factors, not only in that population, but
also in their relatives. The major results of that study showed a
very direct relation between blood pressure and body weight12,
aggregation of blood pressure and body mass between the members
of a same family13, anthropometrics indices, blood pressure and
left ventricular mass in adolescents14, aggregation of blood pressure
and metabolic risk factors in adolescents and their relatives15
and hyperglycemia, hyperinsulinemia, overweight, and elevated blood
pressure in young adults16.

However, of all risk factors of the metabolic syndrome, the pre-
ence of overweight/obesity emerges as the most important, es-
pecially in the United States, where its prevalence increased 2 to 4
times, particularly among the African Americans and Latin Ame-
ricans17. But this same phenomenon has also been observed in
countries with a transitional economy, such as Brazil, as shown in
the research carried out by the Brazilian Institute of Geography and
Statistics18, which has confirmed an effective evolution in the
anthropometrics-nutritional profile of the entire Brazilian population,
including children and adolescents, in the time period between 1974-
1975 and 2002-2003 (Figures 1 and 2). In such period, a significant
decrease was observed in the prevalence of under nutrition, more
marked in the male sex, while a continuous and intense increase
was observed in overweight and obesity in both sexes, although
greater among women. The findings in children and adolescents
should be emphasized: in the same regions and in the same period,
the prevalence of undernourished children and adolescents decreased
by approximately 50%, while that of overweight/obesity doubled
19,20.

The dietary pattern has also been assessed in that same study,
showing that, regardless of their socioeconomic level, Brazilians
have a wrong dietary pattern as follows: an excessive amount of
sugar, an insufficient amount of fruits and vegetables, and an exces-
sive amount of fat in general, and specially of saturated fat, particu-
larly among the higher-income families living in the most developed
regions of the country (South, Southeast, and West Central) 18.
In addition, there is a great tendency towards a sedentary lifestyle, observed in all studies assessing metabolic syndrome, which propitiates the appearance of alterations related to the glucose and lipid metabolism and an increase in blood pressure, which are well-known important risk factors for the development of cardiovascular diseases. Such findings point to a real probability of an increase in the future cardiovascular morbidity and mortality rates, which have a great socioeconomic impact not only for Brazil, but also for all countries with a transitional economy.

Nonmedicamentous measures aiming at a change in lifestyle, focusing on regular physical activity and a balanced diet, are the first action to be taken. The medicamentous treatment may be necessary and, although not desirable, it has been increasingly used in patients with elevated blood pressure, dyslipidemia, and diabetes. The use of medication to treat obesity may also be considered, although the experience is still small and lacks a long-term assessment.

The importance of primary prevention in children and adolescents

The adoption of primary preventive measures in young individuals has been recognized as of great importance in approaching cardiovascular diseases. The demonstration of the presence of arte-
atherosclerosis in children, adolescents, and young adults, in addition to a greater knowledge about the risk factors in those age groups, points to proposals of rational and effective programs aiming at interfering with those factors as early as possible\textsuperscript{21}. The measures recommended for that age group focus on the adoption of healthy habits, such as avoiding the excessive ingestion of calories, salt, saturated fat, and cholesterol, and engaging in regular physical activity without smoking. Health education focusing on improving nutrition, physical activity and healthy lifestyles for school children and their parents should become a leading role for physicians\textsuperscript{22,23}.

The specific prevention of obesity through diet and physical activity should be the number one priority, because its success will have a positive direct repercussion on dyslipidemia, arterial hypertension, and the alterations in the metabolism of carbohydrates\textsuperscript{21-23}.

The benefits associated with physical activity in young individuals include weight loss, improvement in metabolic parameters, a reduction in blood pressure and insulin resistance, psychic well-being, predisposition to maintain physical activity in adulthood, and, consequently, a decrease in the risk of cardiovascular disease and an increase in life expectancy\textsuperscript{21-23}.

In general, youngsters have been exercising less. Television, videogames, and computers tend to keep them indoors. The lack of safety in big cities inhibits walking and bike riding. At school, the new curricular requirements have reduced the time spent for physical activity. And, finally, the families have become increasingly sedentary.

These observations point towards the need for actions directed to changes in the family as a whole. To counteract poor lifestyles programs for children through health education have just begun in Brazil\textsuperscript{24}.

Governmental programs providing specific areas for practicing physical exercise, a greater supply of physical education teachers, and improved public safety are absolutely necessary. It is also a consensus that such measures will only succeed within a context encompassing joint family, school, community, and government efforts.

In accordance with that vision, the World Heart Federation has elected the slogan “Healthy Weight, Healthy Shape”, an alert against obesity, as the theme for the day of the heart to be celebrated on September, 26th, an initiative in which everybody should get involved.

Only interference at young age will be able to effectively guarantee a healthy adult lifestyle, as far as the cardiovascular system is concerned, thereby favorably influencing the elevated cardiovascular morbidity and mortality rates.

References