

Prevention of Cardiovascular Disease Starts in Childhood

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The importance of good nutrition practices on health and well-being has been recognized for thousands of years. One familiar quote attributed to Hippocrates, “Let thy food be thy medicine and medicine be thy food,” illustrates our long-time appreciation of the important relationship between diet and health. Hippocrates is also recognized for his seminal philosophy about the importance of lifestyle behaviors for good health, as conveyed in the quote: “If we could give every individual the right amount of nourishment and exercise, not too little and not too much, we would have found the safest way to health.” More recently, two-time Nobel laureate Linus Pauling extolled the virtues of a healthy diet, stating, “Good nutrition will prevent 95 percent of all diseases.” Despite this long-held recognition about the importance of good nutrition and lifestyle practices, we are confronted with an epidemic of nutrition- and lifestyle-related diseases that have created a huge burden on society. Consequently, there is an urgent need to advocate for healthy lifestyle practices, including good nutrition, to reduce the global burden of many chronic diseases.

The greatest determinants of cardiovascular disease (CVD) are lifestyle factors that are modifiable, yet the largest contributor to our global disease burden is CVD, which accounts for approximately one-third of all deaths (GBD 2013 Mortality and Causes of Death Collaborators, 2015). For children, the American Heart Association defines ideal cardiovascular health in terms of four health behaviors: (1) never smoked; (2) body mass index below the 85th percentile; (3) at least 60 minutes per day of moderate or vigorous physical activity; and (4) a healthy diet score. Ideal cardiovascular health is also dependent on three CVD risk factors: (1) total cholesterol less than 170mg/dL; (2) blood pressure below the 90th percentile; and (3) fasting blood glucose less than 100 mg/dL.

Ideal cardiovascular health is achieved by few children and adolescents in the United States (Shay et al., 2015; Steinberger et al., 2016), which is of concern because better cardiovascular health in childhood is associated with a reduced risk of hypertension, elevated low-density lipoprotein cholesterol, and metabolic

syndrome in adulthood (Laitinen et al., 2012). Furthermore, researchers have shown that children with just one ideal CVD health factor versus six factors at ideal levels is equivalent to an additional 12 years of aging (Laitinen et al., 2012).

A healthy diet is a cornerstone for the prevention of CVD risk factor development and modification of existing risk factors. However, of the seven health behaviors/factors that comprise ideal cardiovascular health, consumption of a healthy diet is the least frequently rated as ideal in children and adolescents (both in the United States and Europe) (Pacor et al., 2016). The healthy diet score comprises the following components: at least 4.5 cups per day of fruit and vegetables; at least two servings (7oz) per week of fish; less than 1500mg of sodium per day; less than 450kcal (36oz) of sugar-sweetened beverages per week; and at least three servings of whole grains per day (Steinberger et al., 2016).

There is now clear evidence that a poor diet in childhood is associated with CVD risk factor development

and adverse vascular health in adulthood. In the Amsterdam Growth and Health Longitudinal Study, children with the lowest adherence to a Mediterranean diet had stiffer arteries at age 36 (van de Laar et al., 2013). Conversely, those who had a diet that more closely resembled the Mediterranean diet in childhood had lower blood pressure and total cholesterol at age 36. Studies have also shown that a higher intake of vegetables, fiber, and fruit in childhood is associated with better vascular health in adulthood (Aatola et al., 2010; Juonala et al., 2010; van de Laar et al., 2012). Thus, a higher-quality diet during childhood is associated with a lower incidence of CVD risk factors and better vascular health in adulthood.

Adding further evidence to the importance of childhood nutrition, a landmark study conducted in Finland showed that intervening in the diets of children improves health in later adolescence. The Special Turku Coronary Risk Factor Investigation Project (STRIP) recruited families of 6-month-old infants, where half the cohort was provided counseling biannually to replace saturated fat with unsaturated fat; increase intake of fruit, vegetables, and whole grains; reduce salt intake; and choose appropriate portion sizes (Pahkala et al., 2013). The other half of the cohort was not given any dietary counseling. Follow-up of subjects in their late teens showed that those in the group who did not receive dietary counseling were 1.35 times more likely to have a low ideal cardiovascular health score compared with those in the group who received nutritional advice (Pahkala et al., 2013). Adolescents in the nutrition advice group were more likely to have ideal cholesterol and blood pressure compared with control adolescents. Furthermore, those in the nutrition advice group had a 41 percent lower risk of metabolic syndrome compared with the control group at 15–20 years of age (Nupponen et al., 2015). This study provides strong evidence that improving diet during childhood reduces the incidence of risk factors for CVD up to 20 years later.

These studies show that childhood nutrition plays a key role in modifying CVD risk. Unfortunately, a healthy diet is achieved by less than 1 percent of children in the United States, placing them at a higher risk of developing CVD risk factors in childhood and adulthood (Shay et al., 2015). Unlike many CVD risk factors, a poor diet is not easily identified and is often overlooked. There is no test to “diagnose” a poor diet, and unless a child is overweight or obese or has elevated lipids or blood pressure, diet may not even be discussed. It is critical

to the long-term health of our children that they have good nutrition, and, as such, we encourage all health professionals who work with children to ask children, parents, and caregivers of children some simple questions about their diets and discuss with them ways in which their diets could be improved. Questions could include the following:

- How many pieces of fruit have you eaten today?
- Have you eaten any vegetables today?
- How often do you drink soda?

In addition, we encourage health professionals, parents, and caregivers to use the Dietary Guidelines for Americans (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2015), as well as resources from the American Heart Association (American Heart Association, 2014) and the Let’s Move Campaign (Let’s Move), for information about achieving a healthy diet and lifestyle for children.

Because CVD is the leading cause of global disease burden, the World Health Organization has set a target to reduce mortality from noncommunicable disease, including CVD, by 25 percent by 2025 (World Health Organization, 2014). Thus, a societal challenge is to improve the diets of our children to meaningfully impact the burden of CVD worldwide. We can all play a significant role.

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