

Preventive Medicine Needs to Begin with Our Children

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DEAR EDITOR,

The prevalence of obesity and cardiovascular disease (CVD) has become so pervasive that for the first time, the current generation of children in the United States are not expected to live as long as their parents.^[1] Although CVD is typically associated with middle-or old-age, the atherosclerotic process often initiates early in childhood and is occurring at an increasing rate.^[2,3] There is a consensus that the current epidemic is founded upon changes to modifiable life-style factors.^[4] Adverse changes in physical activity, nutrition, and sleep behavior have been strongly linked to the development of a host of cardio-metabolic conditions, including obesity, dyslipidemia, hypertension, and type 2 diabetes mellitus.^[5] These conditions independently and additively increase CVD risk, even in children and adolescents.^[6-10]

The increasing rate of sedentariness and decreasing rate of physical activity may lead to inadequate development of musculoskeletal, neuromuscular, endocrine, and cardiovascular systems.^[11-13] The result is that today's children and adolescents are not only becoming pre-conditioned for CVD, but are also, due to developmental issues, unable to achieve the level of health achieved by their parents.^[1] By only focusing on the clinical manifestations of CVD that is "reactive" medicine, we are tackling the problem too late. Public

health-care policy needs to place a stronger focus on paediatric "preventive" medicine, not only for the well-being of children, but also to alleviate the increasing economic cost that is being placed on society through the prolonged burden of disease.^[14,15]

A particular concern is the growing obesity epidemic.^[14-16] Although genetic factors might influence the susceptibility of individuals to gain weight,^[17] there is a consensus that changes in life-style activities have driven the current epidemic.^[4] Dietary modification has been shown to be relatively ineffective in the long-term treatment of obesity in adults^[18,19] and it has been suggested that obesity prevention in childhood and adolescence should focus on physical activity rather than diet because of fears relating to eating disorders.^[20] The World Health Organisation (WHO) recommends that children aged 6-17 years participate in at least 60 min of moderate-to-vigorous intensity physical activity every day and perform muscle-strengthening and bone strengthening exercise on at least 3 days/week.^[21] However as obese children and adolescents are disadvantaged by physical (i.e. excess body weight) and cardiovascular constraints, their capacity to comply with WHO recommendations is restricted.

A meta-analysis of exercise treatment programs in obese children and adolescents has shown that the most effective exercise paradigm for this population

incorporates high repetition resistance training combined with low-intensity, long-duration aerobic exercise.^[22] Resistance training has been shown to be well-tolerated by this cohort and results in positive changes to body composition. Low-intensity, long-duration aerobic exercise has been shown to have positive results on body weight and body composition in obese children,^[20] but is ultimately limited in capacity when compared to high-intensity exercise for decreasing obesity, cardio-metabolic conditions, and the progression of CVD.^[23-25] There remains a pressing need to develop and assess vigorous-intensity exercise programs, which are safe, tolerable, and enjoyable for obese children and adolescents.

It is commonly accepted that increased physical activity is required to curb the obesity epidemic,^[20,26] but physical activity interventions with children are notoriously difficult to implement over a long-duration. A recent systematic review and meta-analysis^[27] reported that physical activity interventions had at best a small effect on children's overall activity levels. This suggests that standardised exercise "interventions" are ineffective and that fun, enjoyable "life-style changes" are required to optimise the likelihood of long-term sustainability. Such discouraging data^[27] necessitates the need for researchers to adopt holistic research paradigms. Researchers should be cognisant of inter-related life-style factors, including physical activity/inactivity, nutrition, and sleep behavior as well as human factors including motivation and well-being. Objective measures of daily physical activity, nutrition, sleep behavior, and human factors are required to provide insights into the efficacy of a physical activity life-style program.

Lastly, indigenous youth appear to be particularly susceptible to the ever pervasive prongs of obesity. For example, within New Zealand, much higher rates of obesity have been reported for Pasifika (22.3%) and Māori (11.8%) children than their European counterparts (5.5%), placing these cohorts at greater risk for cardio-metabolic disorders and subsequent CVD.^[28] Life-styles programs for indigenous cohorts should not only be physiologically appropriate, but also culturally sensitive. Appropriately designed programs should present an accessible, relatively inexpensive, fun, and engaging option for promoting healthy life-styles that are culturally-aligned.^[29,30]

Increasing rates of obesity and subsequent CVD are not only placing an increasing burden on the physiological and psychological well-being of today's children and adolescents, but also on the wider society. Public health-care policy needs to place a stronger focus on paediatric "preventive" medicine, and holistic physical activity programs are recommended.

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