

OBESITY AND PHYSICAL INACTIVITY AMONG SAUDI CHILDREN AND YOUTH: CHALLENGES TO FUTURE PUBLIC HEALTH

Over the past three decades, tremendous changes have taken place in the pattern of physical activity and eating habits of Saudi children and youth. The dramatic lifestyle transformation is thought to have contributed immensely to the recent increase in the prevalence of obesity among Saudi children and youth.^{1,2} The rising trends in the prevalence of obesity reflect a population shift toward positive energy balance. Caloric intake and physical activity constitute the two modifying factors in the energy balance equation. Caloric dense foods are increasingly becoming accessible to Saudi children and adolescents and the time spent in sedentary activities has also increased sharply.

Although we have no published research documenting the patterns of physical activity and the prevalence of obesity in Saudi children and youth of past generations, anecdotal evidence indicates that they were fairly active, physically fit and mostly very lean individuals. Today's children and youth, however, seem to have become obese and have adopted a less active lifestyle. As depicted in Table 1, Saudi children nowadays expend less energy in their daily activities compared with their counterparts three or four decades ago. Furthermore, our decade-long longitudinal assessment of Saudi youth indicates that the proportion of Saudi youth who are inactive and/or obese from childhood to early adulthood has substantially increased.³ Most Saudi children and adolescents are now transported to and from school, especially in the urban areas of the Kingdom. Unpublished research conducted just in the past year by our team indicates that over 71% of the primary school children in Riyadh travel to and from schools by car. In addition, recent research from our laboratory, using all-day heart rate telemetry and accelerometry, indicates that nearly 60% of Saudi children and over 71% of youth are not active enough to meet the minimal weekly requirement of moderate to vigorous health-enhancing physical activity.^{4, 5} Moreover, inactive and obese children and youth exhibit more CHD risk factors than their lean counterparts.³

Time spent watching television, videos, and computer games also contribute immensely to the inactivity epidemic and hence the prevalence of obesity in Saudi children and youth. Indeed, longitudinal assessment of Saudi youth from childhood to early adulthood showed that while physical activity levels were drastically reduced, television-viewing time was substantially increased.³ Elsewhere, physical activity was found to be negatively associated with overweight, while watching television and video game use was shown to be positively linked to overweight in children.⁶ Insufficient vigorous physical activity was shown to be a risk factor for higher BMI in adolescent boys and girls.⁷ Recent research suggests that any scheme that decreased time spent in sedentary activities resulted in weight loss in obese children.⁸

Given what we know about the natural history of obesity in childhood, these findings should be of major public health concern. Obesity in childhood and adolescence has both immediate and future health consequences.⁹ Sixty percent of overweight children already suffer from hypertension, hyperlipidemia, and/or hyperinsulinemia.¹⁰ Childhood obesity was shown to be directly linked to abnormalities in blood pressure, lipid, lipoprotein and insulin levels in adults.¹¹ Moreover, increased obesity in childhood and adolescence is most often associated with Type 2 diabetes mellitus.¹² Impaired glucose tolerance was shown to be quite high in both obese children (25%) and obese adolescents (21%).¹³ Furthermore, overweight children and adolescents are at a greater risk of adult obesity¹⁴

In conclusion, obesity and physical inactivity among Saudi children and youth is a crisis facing Saudi Arabia, and action to control it must begin now. Indeed, this crisis presents a challenge to our future public health. Given the current trends in pediatric obesity and the high prevalence of physical inactivity, it is more vital that preventive strategies be implemented throughout schools and in the community. Efforts designed to combat inactivity and childhood obesity must include education, research and intervention. Policy makers, health care providers, educators, and parents should all be involved in this strategy.

REFERENCES

1. Abalkhail B. Overweight and obesity among Saudi Arabian children and adolescents between 1994 and 2000. *Eastern Mediterranean Health Journal* 2002;8:1-8.

2. Al-Hazzaa H. Rising trends in BMI of Saudi adolescents: Evidences from three national cross sectional studies. *Asia Pacific Journal of Clinical Nutrition* 2006; in press.
3. Al-Hazzaa H. Health-related Physical Activity level and Cardiorespiratory Fitness in a Sample of Saudi Youth: a Follow-up Study. Final Report, King Abdulaziz City for Science and Technology, Riyadh, 2004.
4. Al-Hazzaa H. Physical activity, fitness and fatness among Saudi children and adolescents: implications for cardiovascular health. *Saudi Med J* 2002;23:144-50.
5. Al-Hazzaa H. Prevalence of physical inactivity in Saudi society: A brief review. *East Mediterranean Health J* 2004;11:45-51.
6. Tremblay M, Willms J. Is the Canadian childhood obesity epidemic related to physical activity? *Int J Obes Relat Metab Disord* 2003; 27: 1100-5.
7. Patrick K, Norman G, Calfas K, Sallis J, Zabinski M, Rupp J, Cella J. Diet, physical activity and sedentary behaviors as risk factors for overweight in adolescence. *Arch Pediatr Adolesc Med* 2004; 158:385-90.
8. Epstein L, Valoski A, Vara L, McCurley J, Winicwski L, Kalarichian M, et al. Effects of decreasing sedentary behavior on weight change in obese children. *Health Psychol* 1995;14:109-15.
9. Reilly J, Methven E, McDowell Z, Hacking B, Alexander D, Stewart L, Kelnar C. Health consequences of obesity. *Arch Dis Child* 2003;88:748-52.
10. Freedman D, Dietz W, Srinivasan S, Berenson G. The relation of overweight to cardiovascular risk factors among children and adolescents: The Bogalusa Heart Study. *Pediatrics* 1999;103:1175-82.
11. Freedman D, Khan L, Dietz W, Srinivasan S, Berenson G. Relationship of childhood obesity to coronary heart disease risk factors in adulthood: The Bogalusa Heart Study. *Pediatrics* 2001;108: 712-8.
12. Pinhas-Hamiel O, Dolan L, Daniels S, Standiford D, Khoury P, Zeitler P. Increased incidence of non-insulin dependent diabetes mellitus among adolescents. *J Pediatr* 1999;128:608-15.
13. Sinha T, Fisch G, Teague B, Tamborlane W, Banyas B, Allen K, et al. Prevalence of impaired glucose tolerance among children and adolescents with marked obesity. *N Engl J Med* 2002;346: 802-10.
14. Whitaker R, Wright J, Pepe M, Seidel K, Dietz W. Predicting obesity in young adulthood from childhood and parental obesity. *N Engl J Med* 1997;337:869-73.

Table1: Comparison of energy expenditure due to some daily activities between current generation of Saudi children (today) and the past generations of children and youth (yesterday).

Activity	Yesterday	Today
Walking to & from school	++++	+
Walking to & from the nearby grocery or bakery stores	++++	+
Actively playing sports in the neighborhood	++++	+
Riding bicycle	++++	-
Watching television	+	++++
Playing video/computer games	-	++++

- Nil; + very little; + + + + a lot

Prof. Hazzaa M. Al-Hazzaa, PhD, FACSM
 Professor and Director
 Exercise Physiology Laboratory
 King Saud University, Riyadh
 Saudi Arabia