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Childhood Obesity In Developing Societies

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In most developing societies, being thin as an adult has long been equated with poor health and thinness in babies has been associated with increased risk of illness. Thus, increase in body weight and girth has often been perceived as being both healthy and attractive and as a sign of increasing affluence and wealth of the family. However, as developing societies industrialise and urbanise, and as standards of living rise, weight gain and obesity are beginning to pose a growing threat to the health of the citizens.

Obesity is now widely prevalent in several developing countries, particularly those in rapid transition, and is affecting both children and adults. It is now vying with other traditional public health concerns in these societies, such as undernutrition and infectious diseases, as a significant contributor to the ill health of the population. Increasing prevalence of obesity in a population, and particularly among children, is an early indicator of emerging health burden due to non-communicable chronic diseases (NCDs) in developing societies.

PREVALENCE

The absence of good nationally representative data and the lack of consistency between studies of the classification of obesity in children limits our ability to look at either the comparative prevalence or the secular trends in childhood obesity, both in developed and developing

societies. Most studies from developed countries report an increasing prevalence of obesity in childhood and adolescence. In the USA, prevalence of overweight (that is, >85th percentile of weight-for-height) in the Bogalusa Heart study increased two-fold between 1973 and 1994, with more dramatic increases on an annual basis in the last 10 years¹. Over a similar period (1974-1993) in Japan, the prevalence of obesity (as indicated by a >120 per cent of standard body weight) in children from six to 14 years, increased every year and doubled from 5 per cent to 10 per cent over the 20 year period².

Increases in the prevalence of childhood obesity is also seen in developing countries. In Thailand, obesity in six- to 12-year-olds (defined by weight-for-height >120 per cent of the Bangkok reference) increased from 12.2 per cent to 15.6 per cent in two-years, between 1991 and 1993³, while a similar prevalence (15.8 per cent) was observed in a recent study of six- to 18-year-olds in Saudi Arabia⁴.

Figures on the global prevalence of childhood obesity have been compiled by the WHO where several developing countries such as Nicaragua, Brazil, Antigua, Zambia, Venezuela and Peru, show a prevalence rate of over 2 per cent. Countries such as Barbados, Honduras, Lesotho, Bolivia, Trinidad and Tobago, Iran and Mauritius have a >4 per cent prevalence; while Jamaica and Chile top the list with a 10 per cent greater

prevalence rate in preschool children (up to five years). According to this database with WHO, India has a preschool child obesity prevalence of about 1 per cent⁵.

DIAGNOSIS

One of the major issues for assessing the magnitude of the problem and for observing changes or trends in childhood obesity, be it globally, regionally or nationally, is the need to use a uniform criteria for the definition of childhood obesity. It is only recently that a general agreement has been reached on a universally applicable criteria for obesity in adults^{6,7,8}. In the case of children and adolescents, however, there has been little agreement over either the criteria or the classification of overweight and obesity.

The WHO recommends the use of appropriate weight-for-height in children based on the NCHS growth standard and considers >+2 Z scores

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the interaction of both genetic and environmental determinants. Recent studies have yielded levels of heritabilities of the order of between 25 to 40 per cent of the individual difference in BMI or body fat, whereas studies on overfeeding and under-feeding have shown less variation in monozygotic as compared to dizygotic twins¹³.

The risk of obesity is two to three times greater for an individual with a family history of obesity and increases further with severe obesity. Evidence is thus persuasive that there is a genetic component that may be involved in a predisposition to obesity but that obesity *per se* will only manifest when the appropriate environmental conditions that promote positive energy balance occur.

The genetic susceptibility to obesity may, in fact, be higher in some ethnic groups such as the Pima Indians, but changes in environmental factors are crucial in promoting obesity. These include dietary and life-style changes that accompany urbanisation and economic development, best seen in societies in rapid developmental transition. Transitional societies which are rapidly urbanising demonstrate increases in energy intakes, dramatic increases in fat intake (with consequent reductions in carbohydrate intakes) and reductions in occupational activities associated with increasing leisure time activity, much of which is largely sedentary, thereby increasing the risk of obesity in populations.

Life-style changes resulting in physical inactivity and sedentary behaviour seem to be more important in contributing to the problem of obesity in children. This is exemplified by more time in a day spent by children in physically passive behaviour such as TV viewing, working or playing games on a computer, talking on the telephone, etc¹⁴. Children in the USA spend more time watching TV than in attending school¹⁵. Such passive behaviour is often accompanied by other adverse practices such as snacking or consuming high fat or high sugar foods alongside such sedentary behaviour. Life-style changes further reflect parents' anxieties regarding children and their future, which results in children being ferried and fetched from school in cars and being discouraged from active play in

the streets for fear of accidents and encouraged to sit and study. All this contributes further to reduced physical activity levels when dietary intakes are not constrained in a growing child.

CRITICAL PERIODS OF RISK

It appears that there is a possibility that nutritional perturbations during critical periods of development, such as prenatal and early post-natal period, childhood and adolescence, increase the risk of obesity¹⁶.

Prenatal and early post-natal:

The Dutch hunger winter data has demonstrated the effects of famine and energy deprivation on later obesity – the prevalence of obesity was increased among young men who were exposed to famine *in utero* in the first two trimesters of pregnancy while it was lowest among those exposed in the last trimester of pregnancy and the early post-natal period¹⁷. Studies of infants of diabetic mothers offer additional support that the third trimester is a critical period for the entrainment of increased adiposity – the prevalence of obesity at all stages of childhood and adolescence among children of diabetic mothers was higher than that in pre- and non-diabetic mothers¹⁸.

Further, infants of mothers who required insulin during pregnancy had a greater prevalence of obesity at age seven compared to infants of mothers who had glucose intolerance but did not need insulin therapy, indicating that either the severity of the glucose intolerance or the use of insulin during pregnancy may represent important risk factors¹⁹. Barker has repeatedly shown the effects of low birth-weight on adult onset NCDs and has shown that low birth-weight is associated with adult onset obesity and, in particular, abdominal obesity²⁰.

Childhood and adolescence:

Another critical period for the development of obesity is during childhood; a period referred to as the time of adiposity rebound. The BMI of an infant increases in the first year of life and decreases subsequently. At about five years of age the BMI increases again and this is called the adiposity rebound. There is increasing evidence that the time of onset of the adiposity rebound will influence subsequent fatness; the earlier the onset of

adiposity rebound the greater the adiposity in childhood and adolescence²¹. Adolescence is another critical period, particularly for girls, since 30 per cent of adult obesity among women begins in early adolescence. This is a period when patterns of fat deposition are determined by hormonal influences. It is also the period when changes in eating behaviour also seem to play an important role in increasing the risk of obesity.

PROSPECTS

Obesity, both in children and adults, is likely to become a serious health problem in developing societies. Economic development and urbanisation are altering dietary habits and life-style patterns, which will promote positive energy balance when food adequacy is achieved among population groups within developing societies. In addition, there is increasing evidence that malnutrition will increase the risk of the development of obesity. Stunting in children is likely to alter the relationship of the appropriateness of weight-for-height in individuals with short stature and thus exaggerate the apparent prevalence of obesity in a population.

Irrespective of the method of classification used, it is important to remind oneself that the use of this commonly used indicator of pre-school childhood malnutrition (weight for height) may exaggerate the problem of obesity among stunted children²². Repeated episodes of malnutrition, followed by nutritional rehabilitation, is known to increase the amount of adipose tissue laid down during the recovery process which will alter the body composition and increase the risk of obesity. It is also believed that the discordance between linear growth and adipocyte development will enhance the latter when the former is affected by malnutrition.

Given the enormous numbers of stunted children in developing societies and the persistence of malnutrition even in countries in rapid developmental transition, it is not unlikely that these factors will contribute towards increasing the problem of obesity in developing countries.

PREVENTION

Three effective approaches can be used to deal with this problem. These are: family-based, school-based

and primary care-based interventions. Children often eat what their parents eat and parental eating behaviour has a strong influence on children. Targeting families is, hence, important and should include not merely dietary approaches but also attempt to deal with sedentary behaviour practices. In the management of an obese child, family-based interventions have not always been successful, although a more recent report indicates that use of the parent as the exclusive agent of change can be successful²³.

Children spend a fair proportion of time in schools which makes school-based interventions important. These include encouraging schools to devote more time for physical education, promoting safe walking or cycling to school where possible, encouraging a positive attitude to activity and imparting skills to continue to be active in leisure sports after leaving school, and promoting an active school 'concept' by opening up its sports and recreational facilities for use of the community. School-based programmes, where regular exercise was integrated into the school curricula, have been shown to be effective in improving weight and health status of children in Australia²⁴ and Singapore²⁵.

Primary care-based interventions when targeted properly can prevent the speed of obesity in children from a very young age. Providing mothers with appropriate advice about breastfeeding, weaning and diet for toddlers in primary care settings can not only prevent obesity in children but can also help manage the problem among mothers²⁶. Programme strategies that enable health professionals to have contacts from an early age at primary care levels have been shown to be effective both in the prevention and in the management of childhood obesity²⁷. This is clearly a useful strategy in countries such as India where contact with health professionals occurs at an early age in order to cater to the requirements of immunisation of the young infant.

Obesity, its attendant health consequences and the consequent health burden, are expected to reach epidemic proportions in developing countries such as India, particularly in some sections of the population. Overweight and obesity in children

and adolescents can no longer be considered as factors reflecting the economic development and the attainment of food adequacy in developing societies. Childhood obesity is the prelude to a public health disaster that we will have to deal with in the new millennium. There is an urgent need to address the problem and now is the time to act. It makes more sense to prevent the epidemic of obesity and its attendant health problems than to invest in high tech tertiary care facilities to tackle the health burden associated with obesity. And we need to begin with our children – the future adult citizens of a nation!

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