

Session III :

The Obesogenic
Environment during
Childhood and
Adolescence

The Nutrition transition and childhood obesity: Canadian perspectives

In Canada, child and youth overweight and obesity rates have risen dramatically over the past 25-30 years. For example, measured rates have gone from 12-30% (overweight) and from 2-10% (obesity) of 12-17 year olds and from 1980- 2004. There is a socio-economic gradient – obesity rates are higher in households with lower socio-economic status (particularly lower education levels). Unfortunately, there is no large scale, regular surveillance system of children's food intake in Canada (a major data gap).

Using the ANGELO Framework (Analysis Grid for Environments Linked to Obesity) of Swinburn, Egger & Raza, 1999, determinants of healthy/ unhealthy eating can be classified into the following environment types: physical, economic, socio-cultural and political. Physical environments refers to the availability of and accessibility to foods. Increasing amounts of food are available for Canadian consumption over the past few decades. The economic environment (financial factors) include factors such as the observation that in Canada, food is increasingly marketed as a profitable commodity, and higher cost for healthy foods are common. The sociocultural environment addresses the beliefs and values in a society. In Canada, Aboriginal Canadians are at significant risk for obesity, and increasing risk of obesity with length of immigration is observed in immigrant populations. The political environment refers to policies affecting availability of healthy (or unhealthy) food. There have been recent changes in various jurisdictions throughout Canada imposing school food policies which limit "junk" food.

Research needs :

1. What are the mechanisms through which environment contributes to childhood obesity?
2. What are the implications of the nutrition transition on diet quality and micronutrient status?
3. What are the most appropriate and effective interventions to reverse the epidemic, and can India learn from Canada's experience to slow the progression of childhood obesity?



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Suggested reading :

1. Vallianatos, H., & Raine, K. Consuming Food and Constructing Identifies among Arabic and South Asian Immigrant Women. *Food, Culture and Society*, 11(3):355-373, 2008.
2. Raine, K. Determinants of Healthy Eating in Canada: An Overview and Synthesis. *Canadian Journal of Public Health*, 96 (Supplement 3): S8-S14, 2005.

Nutrition transition in India

India is experiencing rapid Nutrition transition along with epidemiological transition. The incidence of communicable diseases is decreasing while the prevalence of non-communicable disease like cardiovascular diseases, diabetes, hypertension, obesity is increasing in epidemic proportions. As a part of Nutrition transition, there is an increase in urbanization leading to higher employment shift from agricultural sector to industry and service sectors, use of energy saving devices especially universal use of motor transport. These changes are leading to decrease in physical activities and thereby positive energy balance. Due to increase socio-economic development in the country, there is increase availability of foods at affordable prices leading to changes in dietary consumption patterns.

We have data on the body composition of Low Birth Weight (LBW), Small Gestational Age (SGA) born to undernourished mothers (suffering from chronic energy deficiency) which have been included in the cohort studies initiated during 1960s and 1970s. At present, the SGA and LBW are born to optimally nourished mothers. In India, we are observing the prevalence of over nutrition and under nutrition simultaneously in the same communities. Recent scientific reports have documented the prevalence of vitamin D deficiency (clinical and sub-clinical) amongst children in the range of 40 to 90% as well. The traditional Indian diet is cereal based, high in fiber, rich in micronutrients, low in fats and healthy. The pulses are the main source of protein of the low socio-economic group population. The production of pulses has decreased during last 30 years. It has been documented that there is a gradual decline in consumption of pulses by the low income group population. India is implementing two large food supplementation programs: i) Integrated Child Health Scheme (ICDS) between 6 months to 6 years and ii) Mid Day Meal for children in the age group of 6 years to 11 years. Under these schemes, food is provided to every child every day.

Research Needs:

1. Assessment of body composition of low birth weight (LBW), small gestational age (SGA), born to optimally nourished mothers of various socio-economic classes and its determinants.



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In addition, research on body composition of Pre-term new born to healthy mothers of affluent families which are delivering due to obstetrical interventions.

2. Role of micronutrients, especially Vitamin D in obesity.
3. Role of traditional diets and eating habits
4. Impact of low intake of protein on "muscle mass" of subjects belonging to low income groups.
5. Composition of food supplements provided under National programs so that the incidence of chronic Noncommunicable diseases in adults can be reduced.

The Obesogenic environment during childhood and adolescence: Drivers of physical inactivity

Cultural evolution has resulted in innovative changes to the environment in which most people now live. Humans have found many different ways to reduce energy expenditure (e.g., motorized vehicles); at the same time, we produce, store, and consume more calories than ever before. It is suggested that increasing levels of obesity in developing countries are due to the 'nutrition transition' in which rapid changes in diet and physical activity related to economic development can put the health of populations at risk for obesity and related diseases. Very little information exists on the extent to which the nutrition transition has influenced the physical activity of children in India.

Given that physical and social environments affect the obesity status of populations, emigrating from one country to another may influence the bodyweight of individuals. Thus, one important question is whether the physical activity levels of Indian children and Indo-Canadian children vary as a result of where they live. To acknowledge the role of environment, Egger and Swinburn (1997) have conceptualized obesity from an ecological perspective. For both energy intake and physical activity, they identified socio-cultural factors and influences in the physical, economic, and political environments. Similarly, Davison and Birch (2001) proposed that becoming overweight in childhood is based on behavioural patterns such as physical inactivity and dietary intake which are shaped by characteristics of the child, family, and broader society. For instance, the design of the neighbourhood where Canadian children reside can have an influence on their physical activity (Holt et al., 2008) and risk for obesity (Spence, Cutumisu, Edwards, & Evans, 2008). Thus, the prevalence of obesity in any population is dictated by the environment in which people live.

Research Needs:

Currently, little is known about how social and contextual factors influence the physical activity of children and adolescents living in



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developing countries. Thus, is useful to consider the following questions:

- 1) Are there differences in physical activity between children living in India and Indo-Canadian children, and does type of play (active vs. sedentary) vary by region (urban vs. rural) in India
- 2) What is the access to parks and playgrounds for Indian children? Is the school setting a critical factor? How does population density and the social and environmental factors influence access to space and physical activity?
- 3) Can a Report Card on Physical Activity for Indian Children be developed?

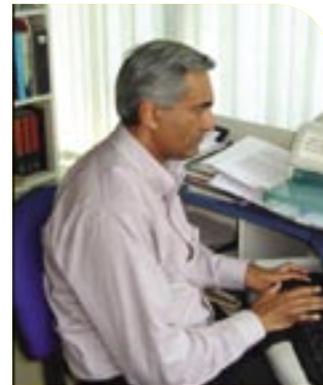
Physical inactivity as a driver of obesity – The Indian perspective

There is data which suggests that childhood overweight and obesity in India is high, at least in the urban, affluent population. However, there is very limited information on physical activity patterns in Indian children and the extent to which physical inactivity contributes to obesity.

Data from the National Family Health Survey-3 suggest that 8.6% of children in urban areas and 12.9% in rural areas perform paid or unpaid work. This together with the fact that school enrollment rates are variable across India, suggests that physical activity needs to be assessed across multiple domains. Ecological data indicate that school based activity may be compromised by the absence of basic infrastructure; for instance, only 52.16% of all schools in 2005-6 had a playground (<http://www.dise.in/downloads/Ar0506/Facility.pdf>). Additionally, the gap between implementation of physical education against norms is high in Asia, although there are no specific data for India (Kinesiology; 2008; 40(1):5-28). A recent report on urban transport in India highlights the problems of walkability and road safety (Ministry of Urban Development, 2008); this has implications for understanding choices of transport to and from school and the potential for interventions in this area. At an individual level, published data suggest that sleep \leq 8.5 hrs/day is associated with an increased odds of overweight of 6.8, while TV viewing $>$ 45 min had a three fold increase in risk of overweight (Nutrition Journal 2007; 6: 25). Reduced participation in a variety of household and leisure related activities were all associated with increased overweight in 12-18 yr old adolescents (Obesity 2007; 15: 1384-1390).

Research needs:

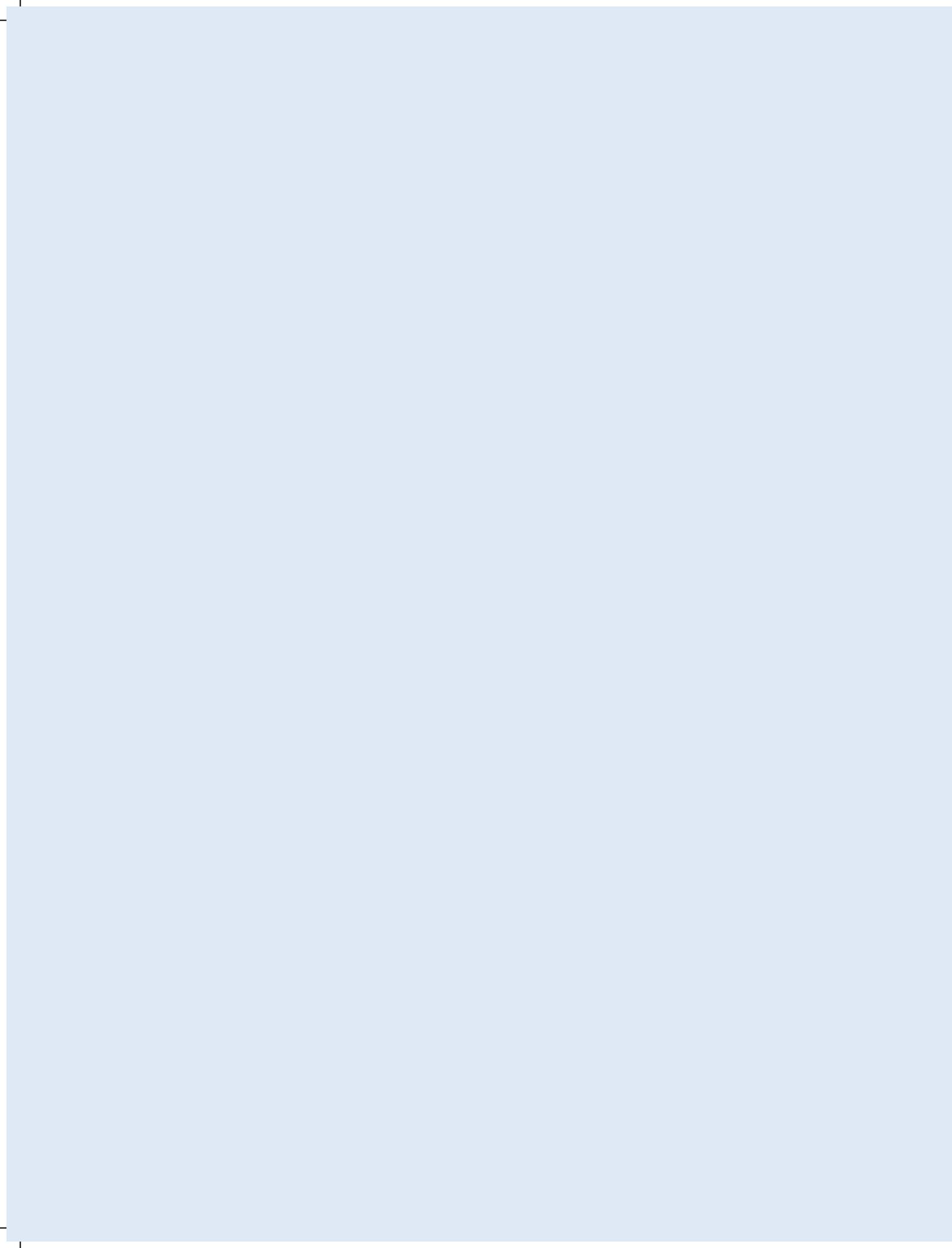
1. Develop and validate of objective physical activity assessment using current technology– current data in India are all reported; there considerable bias and error in this.
2. Evaluate the built environment and its impact on physical activity / obesity using GIS and spatial epidemiological techniques – this is a completely unexplored area in India in relation to children.



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3. Enhance social science / qualitative research into understanding determinants / attitudes / barriers related to physical activity patterns – this is necessary to translate patterns of physical activity into possible interventions.
4. Evaluate Physical activity in all its dimensions across a continuum of change (rural – rural town – urban slum – urban middle class – recent migrant – 2nd generation migrants in Canada)
5. Evaluate the impact of physical activity interventions including yoga on the “Indian phenotype” and its functional consequences.



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WORKING GROUP
REPORTS

3 Working Group - I

Over-nutrition, nutritional transition and the role of micronutrients

There is a huge gap in the knowledge on nutritional transition, its definitions, body size and composition, correlation to functionality and development stages of life cycle. In India nutritional data is collected periodically through the National Family Health Surveys, National Nutrition Monitoring Bureau and the National Sample Survey Organization, while in Canada there is CCHS and CHMS. There are consumer surveys undertaken in both countries.

Recommendations:

1. Investigate the relationship of nutrition transition, development and undernutrition taking the varied progress within India and the higher end of development in Canada.
2. Interaction of body fat as protective/ predisposing to micronutrient deficiencies



3. Working Group - II

Physical activity and the built environment

Physical activity can be done as free willing daily routine activity or as a structured activity through exercise regimes or sports. The importance of physical activity as a driver of the obesity transition needs to be studied throughout the spectrum of migration from less developed to more developed environments, as well as various stages of the life cycle. The built environment drives physical activity behavior at the population level. Physical activity as an intervention to prevent nutritional transition and to deal with obesity related co-morbidities needs better appreciation at individual, community and policy levels. Spatial epidemiology is a powerful tool to study the environment for physical activity along with other related behaviors.

Recommendations:

1. Identify attitudes /barriers related to physical activity including issues related to Seasonality and Acceptance of physical activity interventions in various settings
2. Enhance capacities and tools for assessment of physical activity in epidemiological settings
3. Establish physical activity guidelines for Indian phenotype
4. Determine the extent and determinants of Non-Exercise Activity Thermogenesis (NEAT) in South Asians
5. Utilize Spatial Epidemiology to assess the built environment and its health impact

