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Changes in body size, shape and nutritional status of Middle-Class Bengali boys of Kolkata, India, 1982–2002

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Abstract

Growth changes over time among school-aged boys in Kolkata, India, have been investigated using two surveys: 1982–1983 ($n = 816$) and 1999–2002 ($n = 1187$). The two surveys were implemented according to highly similar protocols which strongly adds to the reliability and accuracy of the results of the study. Age-specific average height, weight and BMI all increased during these two decades (by respectively, 3.2 cm, 6.1 kg and 2.1 kg/m^2), while relative sitting height and sitting height-subischial leg length ratio decreased for almost all ages between 7.0 and 16.0 years. Moreover, the prevalence of stunting and thinness declined (stunting from 11.2% to 4.9%, $p < 0.01$, thinness from 50.5% to 22%, $p < 0.01$), while the prevalence of overweight increased (from 4.7% to 17.2%, $p < 0.01$). Through analysis of variance, the relationships between various socio-economic factors and anthropometric traits are analyzed. Factors strongly related with positive changes in anthropometric traits are maternal education and family expenditure.

JEL classification : I12; I31

Keywords: Secular trends; Physical growth; Nutritional status; Body mass index; Body shape; Kolkata; India

1. Introduction

Over the last few decades the countries of South and South-East Asia, Africa and Latin America are passing through the phases of developmental transition in varying rates (Caballero

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and Popkin, 2002). Transition is observed in all aspects of human lives such as disease patterns (epidemiological transition), demographic structure, dietary habits, nutritional status, lifestyles and activity patterns, and socio-economic and ecological conditions. India, being one of the low-income countries of the world, is also experiencing a similar transition in accordance with its acceptance of new liberal economic policies in the early 1990s (Thankappan, 2001). Though in its early phase, the country has already started manifesting most of the typical features of the transitional society as evident from results of the recently conducted studies from the urban areas in particular (Popkin, 2002). Some of the major consequences of this transition are observed to be rapid spread of urbanization, increased magnitude of socio-economic differences (Baten and Fraunholz, 2004), and coexistence of malnutrition and obesity (Shetty, 1999; Chatterjee, 2002; Gillespie and Haddad, 2003). In many urban areas of India increased consumption of energy and fat in conjunction with reduced levels of physical activity was found to be associated with escalation of adolescent and adult obesity. Countrywide escalation of non-communicable diseases like non-insulin dependent diabetes, hypertension, coronary heart disease and other metabolic disorders are also reported (Gopinath et al., 1994; Chadha et al., 1997; Drewnowski and Popkin, 1997; Shetty, 1999; Kapil et al., 2002; Khadilkar and Khadilkar, 2004). According to one prediction 20% of Indian females and 16% of males will be overweight by the year 2020 (Gillespie and Haddad, 2003), and the incidence of chronic diseases is expected to increase (Gopalan, 1998). All these transformations are said to be connected to the implementation of new liberal economic policies (Gopalan, 1992; Shetty and Gopalan, 1998).

A country's developmental progress and overall changes in socio-economic structure are reflected in the outcome of secular trend studies on physical growth, development, and rate of maturation of children (Tanner, 1986). Though largely carried out in the industrialized and developed countries of the world (van Wieringen, 1986), the occurrence of secular phenomena in these measures is generally observed to be linked with the changes in socio-economic, hygienic, health and nutritional conditions of the respective populations over a considerable lapse of time (Bielicki, 1986; Fogel, 1986; Malina, 1990; Brennan et al., 1994, 1995; Komlos and Baten, 1998; Bodzsár and Susanne, 1998).

The observation that various socio-economic factors play a role in the phenomena of secular growth can be put within the framework of Sen's capability approach (Sen, 1993). The concepts of endowments, entitlements, capabilities and functionings, as developed by Sen and others, bring to expression the fact that the determinants of living standards and of overall levels of people's well-being are multidimensional, involving not only individual characteristics and choices, but also many external factors, at the level of the community and the society to which people belong (Nussbaum and Sen, 1993; Sen, 1993). In Sen's capability approach, individual well-being may be assessed in terms of 'capability sets' that describe what individuals are free to do or to be (functionings) (Cookson, 2005). In terms of health and nutrition, this may be translated in identifying those factors which need to be available or accessible and what conditions need to be fulfilled for an individual to achieve a certain level of health or nutritional status. For example, improved sanitary conditions may be a requirement for reducing exposure to disease pathogens, which in turn may be translated by individuals to better health and better growth of infants and children. Thus, with respect to nutrition it is now widely acknowledged that it is not only availability and household level access to food that determines nutritional status and growth of children, but that factors such as education, sanitation, access to water, accessibility and quality of health services, and also cultural attitudes and beliefs, are equally important determining factors (Drèze and Sen, 1989). In the Indian context, a special case is the State of Kerala, which is known for its relatively favourable record in terms of health and nutrition, as expressed by a high life expectancy, low rates