



Association between BMI and height in girls aged 7–18 years – a longitudinal study

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With 5 tables

Summary: *Objective:* Several studies indicated that there is a significant relationship between BMI and body height, however, the nature of this relationship is not fully explained. The aim of the study is to evaluate cross relationships between height, BMI and the pace of biological development in girls. *Subject:* 1008 schoolgirls aged 16–18 years for whom earlier data on weight and height were available. *Measurements:* The tests involved body height and weight measurements and obtaining information on the age at menarche. Body height and weight data at earlier age were collected from schools' medical records. Each girl had been measured at the age of 7, 9 and 14 years by qualified school nurses. Age at menarche was used for assessing the pace of biological development. *Results:* Differences in mean BMI depending on body height category (very short, short, average, tall, very tall) were observed only in younger age groups. BMI values increase along with an increase in body height at the age of 7 and 9 years. No statistically significant differences in the age at menarche between respective body height categories were ascertained. An analogy analysis was performed for BMI categories (underweight, normal weight, overweight). Overweight girls were taller than normal-weight and underweight girls up to the age of 14 years. The age at menarche was the earliest for girls, who were at 7 years or at 9 years overweight. At the age of 16–18 years the shortest height and the earliest onset of menarche were reported in the case of overweight subjects. *Conclusion:* Overweight girls were more advanced in growth and development than their peers. Taller body height in overweight children is noted before reaching puberty and it is a consequence of rapid growth and maturation.

Keywords: BMI, height, age at menarche, longitudinal study.

Introduction

The occurrence of childhood overweight and obesity in many countries is so high that it has become an epidemic (Wang & Lobstein 2006). Excess body mass in children have a number of adverse short and long term consequence for physical and mental health. Childhood and adolescent overweight and obesity is related to cardiometabolic morbidity (diabetes, hypertension, ischaemic heart disease, and stroke), asthma and polycystic ovary syndrome symptoms in adulthood (Relly & Kelly 2011). The risk of such diseases increases with the duration of obesity and is negative correlated to age at its onset (Lloyd et al. 2012). The prevalence and consequences of overweight and obesity in children motivate a large number of studies on the subject.