Abstract

Introduction: Children born preterm are at higher risk of overnutrition in adolescence, which is manifested by increased body mass index-for-age (BMI-for-age) and increased abdominal fat mass leading to the risk of non-communicable chronic diseases.

Objectives: The aim of this research was to study how prematurity influences overnutrition in a cohort of adolescents born preterm.

Methods: The study included 91 adolescents born preterm (ABP) from a cohort and a control group of 91 adolescents born at term (ABT). Body mass index and fat mass were determined for all the subjects.

Results: The follow-up of BMI-for-age of the children born preterm showed that the highest proportion of overnutrition was found in the first year (65%) and in adolescence (33%). At this age, no differences were found between the ABP and ABT. Body fat of the ABP was higher than for the ABT (p ≤ 0.01). Both groups’ waist circumference was higher than the normal value at this age. The ratio between BMI and the percentage of fat between ABT and ABP boys was significant at p=0.003.

Conclusions: Both ABP and ABT groups had excess weight, which could be due to the fact they grew up in the same environment that promotes unhealthy lifestyles. The ABP boys had excess fat mass leading to the risk of non-communicable chronic diseases in adulthood.

Keywords: Adolescent born preterm; Overnutrition; Abdominal fat; Waist circumference

Introduction

Studies of children born preterm have followed up postnatal growth of weight and height up to adulthood and related this growth to subsequent size and adiposity measures in adolescence and early adulthood. Findings have shown increased total body fat and higher abdominal adiposity, hypertension, arteriosclerosis, cardiovascular diseases, and resistance to insulin [1]. The trend of overnutrition in adults born preterm is greater in men, who have exhibited increased and altered fat mass distribution [2]. Adverse results associated with those born preterm can be extended to the next generation, that is, children of parents born preterm are at higher risk of increased abdominal adiposity although they are born at term [3].

Recent cohort studies of children born preterm have reported that adults with extremely low birth weight exhibit catch-up growth in childhood and adolescence although the disadvantages in height persist as compared to born at term controls [4]. Other authors report that this pattern can increase the risk of insulin resistance and coronary heart disease [5]. The aim of this research was to study how prematurity influences overnutrition in a cohort of adolescents born preterm.

Patients and Methods

A cohort of children born preterm (1995-1996) and residing in the Province of Nuble, Chile, was followed up from birth to the age of 15-16. The present study included 91 adolescents born preterm (ABP) and a control group of 91 adolescents born at term (ABT) residing in the urban areas of Chillán and San Carlos [6]. Each group consisted of 56 girls and 35 boys. The following anthropometric measures were performed: weight, height, waist circumference, skinfolds, and blood pressure. Body mass index-for-age (BMI-for-age) and gender were compared to the WHO (2007) reference to assess nutritional status.

Data analysis was performed with the STATA 12.0 software. The following tests were used for the association of variables: Chi-square, Fisher’s exact test, Student’s t-test for independent samples, and Spearman’s correlation analysis. The normal distribution was evaluated by the Shapiro-Wilk test at a significance level of α<0.05.

Results

The follow-up of the nutritional status of the children shows that 65% exhibited overnutrition at age 1, which decreased to 30.5% at age 2 and increased to 35.6% at age 3 and 36.1% at age 4. This decreased from age 5 (32.8%) to age 9-10 (21.2%). However, there was a substantial increase to 33% in adolescence at age 15-16 (Figure 1).

When overnutrition was compared in adolescence, no significant differences were found between ABP and ABT. According to gender, ABP girls had 33.5 ± 4.0% body fat and boys 34.4 ± 5.7% whereas ABT girls had 32.9 ± 5.3% and boys’ 29.0 ± 8.4% (p ≤ 0.01). Waist circumference for ABT girls was 77.7 ± 6.7 cm and 103.8 ± 6.7 for boys. A significant correlation was found between BMI and the percentage of fat mass of overnourished ABT and ABP boys (r=0.66; p=0.003). This correlation was not detected in adolescent girls. When comparing ABP boys and girls, a correlation was found in those who were overnourished (r=0.58; p=0.005).

Discussion

The number of children born preterm who were obese in the first year was high but gradually decreased to adolescence; however, those who were overweight significantly increased between prepuberty and adolescence. This contrasts with the results found by Vasylyeva et al.
It is concluded that both groups of adolescents had a high percentage of excess weight, which could be due the fact they grew up in the same environment that promotes unhealthy lifestyles; these unhealthy lifestyles characterize the current context of the Chilean population. Adolescents also had excess fat mass, higher in ABP boys, which could lead to cardiovascular risk in adulthood. Therefore, strategies to prevent the development of obesity should establish early childhood intervention programs, which need to be maintained throughout childhood.

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