

CORRESPONDENCE

Obesity and asthma in Caucasian preschool children: Is there a gender difference?

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Editor,

Okabe et al. (1) investigated the possible association between obesity and asthma in Japanese preschool children, a topic evaluated only by a few studies in this age group.

In a cohort of 34.669 children, current asthma was significantly more prevalent in overweight children compared with underweight and normal weight children, suggesting that even in preschool children obesity is already associated with asthma. The association was still significant even after adjusting for other variables, such as gender, other coexisting allergic disease, and parental history of asthma.

This study has some limitations. Indeed, data were collected using a Japanese version of ISAAC questionnaire filled by parents, which included questions regarding demographics, physician's diagnosis of allergic diseases and parental history of asthma, according to the Japanese pediatric asthma guidelines: (i) ≥ 3 episodes of airway obstruction that was documented by wheezing, decreased air entry, and dyspnea and/or (ii) improvement of airway obstruction following bronchodilator use (2). No data on lung function were collected. Also, underweight and overweight were determined by body mass index (BMI), calculated using the questionnaire data, but the raw calculation of BMI can be associated with inaccurate assessment of weight classification. Finally, these findings may be applicable only to Japanese children since, as also recognized by the authors, ethnic differences exist in body composition, including BMI, body fat mass, and fat distribution between Asian and Caucasian populations.

We therefore decided to evaluate in depth a group of Caucasian preschool children, referred as outpatients to the Allergy Centre of the G. Gaslini Institute in Genoa, Italy. In these children, a clinical diagnosis of asthma was made according to the GINA guidelines (3) and lung function, including airway obstruction reversibility, and skin prick tests using a panel of allergens extracts were tested. Anthropometric measurements assessed according to standard techniques (4). Height was measured with the Harpenden stadiometer and weight with standardized scales. BMI was firstly calculated as weight (kg)/height² (m²) and then expressed as a continuous variable in standard deviation score (SDS) units (z-score). BMI-SDS was computed for each subject using the LMS method: BMI SDS = [(BMI/M)^L - 1]/(LxS) (5). According to BMI reference charts of Rolland-Cachera et al. (6), children were considered overweight when BMI-SDS was > 1 SD and obese when BMI-SDS was > 2 SD.

As reported in Table 1, 55 children, 31 males, median age 6.05 (5.59–6.31) yr, were evaluated. All had mild intermittent asthma and none was on controller medications, such as inhaled corticosteroids or leukotriene modifier. A relevant discrepancy was found on the frequency of overweight/obesity assessed by the simple BMI calculation or by z-score, when males and females were analysed separately. Indeed, using the z-score, 29 children (52.73%) were overweight/obese, with a significant gender difference (38.71% in males and 70.83% in females; $p = 0.018$), not seen when BMI and BMI-SDS were evaluated. No differences between males and females were detected in the frequency of allergic sensitiza-

Table 1 Demographic and clinical characteristics of the study participants

	Whole population	Male	Female	p value
Age (yrs)	6.05 (5.59-6.31)	6.06 (5.71-6.33)	5.98 (5.23-6.30)	0.161
BMI (kg/m ²)	16.61 (1.93)	16.28 (1.73)	17.02 (2.13)	0.163
BMI-SDS	0.87 (1.44)	0.56 (1.13)	1.26 (1.52)	0.268
Frequency of overweight/obesity	29 (52.73%)	12 (38.71%)	17 (70.83%)	0.018
Frequency of atopy	39 (70.91%)	19 (61.29%)	20 (83.33%)	0.074
FEV ₁ (% pred.)	109.31 (13.90)	110.68 (14.87)	107.54 (12.63)	0.412
FVC (% pred.)	98.49 (14.40)	99.87 (15.74)	96.71 (12.57)	0.424
FEF ₂₅₋₇₅ (% pred.)	109.35 (24.42)	112.16 (27.37)	105.71 (19.97)	0.336
FEV ₁ /FVC (% pred.)	114.00 (107-116)	112.00 (104-116)	115.00 (110.00-116.00)	0.062
Percent increase in FEV ₁ after β_2 inhalation	6.87 (12.37)	7.28 (12.80)	6.36 (12.11)	0.802
Frequency of positive β_2 inhalation test	16 (34.04%)	10 (38.46%)	6 (28.57%)	0.477

BMI, body mass index; BMI-SDS, BMI expressed in standard deviation score (SDS) units (z-score); FEV₁, forced expiratory volume in 1 second; % pred., percent of predicted; FVC, forced vital capacity; FEF₂₅₋₇₅, forced expiratory flow.

All numerical data other than age and FEV₁/FVC are reported as mean with standard deviation in parenthesis. Age and FEV₁/FVC are reported as median with lower quartiles and upper quartiles in parentheses. Categorical data are reported as number with percentage in parenthesis.

tion and in pulmonary function values. Finally, no significant relationship between lung function and BMI was detected, but a weak negative relationship between BMI-SDS and Δ FEV₁/FVC after salbutamol was found ($r = -0.352$; $p = 0.015$), suggesting a tendency to a worst airway obstruction reversibility in overweight children.

These findings on a small group of children confirm and reinforce the concept that asthma, even in its mild form, may be associated with obesity already in the preschool age but, possibly, with a relevant sex dependency. In fact, as shown in the Japanese study, also in a Caucasian group being female was

associated with a higher risk of being overweight/obese as compared to males.

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