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Obesity Risk Factors in Turkish Children

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On the basis of the knowledge that the prevalence of obesity in children has increased steadily in recent years, this study aimed to assess the association between obesity and certain risk factors in a group of 6- to 14-year-old children living in Istanbul. The study was carried out at the Istanbul University School of Medicine Hospital. Data were collected from 592 children aged between 6 and 14 years who were examined in general pediatrics clinics. Weight and height measurements were performed on the children and their parents. The children were classified as obese and nonobese in accordance with the body mass index reference values for Turkish children. Energy intake of children was estimated with a 3-day food consumption recording form. A structured questionnaire was used to collect the information from the parents on possible risk factors causing obesity. The physical activity state of the children was assessed. A logistic regression model was developed to examine the relationships between obesity and possible risk factors. Almost 32% (n = 184) and 69% (n = 408) of children were assessed as obese and nonobese, respectively. Although there was no difference in daily energy intakes of obese and nonobese children, 13.6% of obese and 40.9% of nonobese children were reported to do physical activity regularly. Obesity was strongly associated with parental obesity. Furthermore, energy intake; having regular physical activity; presence of obesity in the mother, the father, and the mother's family; and having a mother working out of home were also significantly associated with obesity. Creating awareness in mothers on the importance of a healthy nutrition and encouraging families to participate in physical activities are important points in the prevention of childhood obesity.

Key words: Obesity; Children; Prevention

IN RECENT YEARS, a dramatic increase in the prevalence of obesity among children has been noted in many countries. According to the World Health Organization (2006), approximately 155 million school-aged children are currently overweight or obese worldwide. Recent data indicate that the proportion of overweight or obese children of both genders increased markedly in different areas in the world, including Turkey. It is estimated that today, 13.8% of Turkish children are overweight or obese (Cinaz & Bideci, 2003; Oner et al., 2004).

Obesity in childhood is likely to continue in adulthood and leads to many problems, including an increased risk for development of chronic diseases. The prevalence of the metabolic syndrome is increasing, especially among obese children and adolescents (Budak et al., 2007; Duncan, Li, & Zhou, 2004; Editorial, 2001; Esmaillzadeh, Mirmiran, Azadbakht, Etemadi, & Azizi, 2006; Kim, Park, Kim, & Kim, 2007). Along with its overall impact on health, the time and financial resources burden for the prevention and treatment of obesity is also a factor to consider.

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Obesity is a multifactorial disorder influenced by genetic, behavioral, environmental, and cultural factors. It is known that genetic factors, early childhood obesity, dietary habits such as excessive energy intake and fast-food consumption, lack of physical activity, TV viewing time, parental obesity, mother's employment, mother's education level, socioeconomic level of family, and lack of parental responsibility all affect the development of obesity in childhood (Butte, Cai, Cole, & Comuzzie, 2006; Janssen et al., 2005; Niclas, Yang, Baranowski, Zakeri, & Berenson, 2003; Robinson, 1999; Salbe, Weyer, Lindsay, Ravussin, & Tataranni, 2002; St-Onge, Keller, & Heymsfield, 2003; Treuth, Butte, & Sorkin, 2003; Von Kries et al., 1999; Yanovski, 2003). The measures recommended for prevention of obesity in childhood include promoting breast-feeding, increasing fruit and vegetable intakes, controlling portion size and limiting soft drink consumption, encouraging physical activity, and limiting TV viewing time (Kang et al., 2002; Monzavi et al., 2006; Sharma, 2006).

The study was designed to determine the association of obesity with certain risk factors in children who presented to the outpatient clinics of the pediatric department of the İstanbul Faculty of Medicine Hospital, thus contributing to the worldwide problem of a rational approach in the prevention of obesity.

MATERIALS AND METHODS

Data were collected from 592 children aged between 6 and 14 years who presented to the pediatric outpatient clinics during the period January 2006 to June 2006.

Weight and height of children and their parents were measured by an experienced dietician. Weight was measured with the participants in their underwear using a portable scale sensitive to 0.1 kg. Height was measured using a portable measuring device of an accuracy of ±0.5 cm fixed on the wall. Measurements were made with the participants standing in erect posture, with their shoes off, with their back, buttocks, heels, and head touching the wall. Body mass index (BMI) was calculated according to the [weight (kg) / height $(m)^2$] equation. On the basis of age- and gender-specific percentile curves for Turkish children, children with BMI values higher than the 95th percentile for their age were evaluated as obese, and those who had BMI values between the 5th and 85th percentiles as nonobese (Bundak et al., 2006). These same standards were used in the calculation of BMI *SD* scores. A BMI value of >30 kg/m^2 was taken as the cutoff level for defining obesity in the parents. The BMI values of the relatives were calculated from the weight and height values reported by the parents.

Data pertaining to the certain risk factors causing obesity were obtained by a structured self-administered questionnaire filled by the parents of the children. Birth weight, duration of exclusive and of supplemented breast-feeding, obesity in infancy, parents' education level and occupation, number of family members, presence of obesity among parents and their first-degree relatives, physical activity, and daily energy intake of the children were included in the questionnaire.

Three-day food consumption of the children was also evaluated. Parents were asked to keep a record of all foods and beverages consumed by their children and estimate the quantities in household measures. Total energy intake of children was estimated using a software dietary program (Bebis, 2004). Excessive energy intake was evaluated based on recommended dietary allowances for children and adolescents in Turkey (Ministry of Health, General Directorate of Primary Health Care and Hacettepe University, Department of Nutrition and Dietetics, 2006).

The physical activity state of children was assessed by posing questions to the parents such as, "Does your child perform a physical activity regularly?" "Define the nature, frequency, and duration of this activity" and "How many times of the past 7 days did your children exercise or participate in sports activities which made him/her sweat and breathe hard for at least 20 minutes?" The questions were formulated with the help and approval of a physiotherapist.

The Statistica 7.0 software (Stat Soft Inc., Tulsa, OK) was used in the analysis of the data. Numerical results were expressed as $M \pm SD$, and categorical results were expressed as n (%). Normality distribution of the variables was tested using one-sample Kolmogorov–Smirnov test. Differences between groups were assessed using Student's t test for normal and Mann–Whitney U test for nonnormal distributed data. The chi-square test was used to compare the differences of categorical variables between obese and nonobese groups. Logistic regression analysis was used to identify the certain risk factors