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ORIGINAL ARTICLE

Prevalence of Growth Disorders in a Nationally Representative Sample of Iranian Adolescents According to Socioeconomic Status: The CASPIAN-III Study

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Key Words
adolescents;
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underweight

Background: This study aims to assess the prevalence of growth disorders among a nationally representative sample of Iranian adolescents according to the socioeconomic status (SES) of their living area.
Methods: This nationwide cross-sectional survey was conducted among a representative sample of 5624 adolescents aged 10–18 years. They were selected by multistage cluster sampling from 27 provinces of Iran. Subnational classification of the country was based on geography and social class of each region. Analysis of variance and Chi-square tests were used to compare the prevalence of growth disorders according to sex and SES of the living regions.

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Results: The mean and standard deviation for body mass index was 19.42 (4.09) kg/m^2, with a significant trend from the Southeast region with lowest SES to the Central part with highest SES ($p_{trend} < 0.001$). The prevalence of obesity, combined overweight and obesity, as well as abdominal adiposity increased with a significant trend from low to high SES (all $p_{trend} < 0.001$, except for girls' height, $p_{trend} = 0.003$). The opposite direction was documented for the prevalence of underweight and short stature, with the highest frequencies in the Southeast (lowest SES) and the lowest in Central part (highest SES).
Conclusion: Excess weight was more prevalent in high SES regions, whereas underweight and short stature were more prevalent in low SES regions. These findings underscore the necessity of implementing evidence-based health promotion programs and preventive strategies according to SES.

1. Introduction

Growth is one of the most fundamental phenomena in the pediatric age group. It is influenced by genetic background and a complex interaction between hormonal, nutritional, psychosocial, socioeconomic, and lifestyle habits of individuals.[1] Growth disorders are manifested by different patterns such as short stature, underweight, overweight, and obesity. The prevalence of such disorders has large variations in different communities. Growth disorders in childhood might increase the risk of different associated comorbidities in later life; they can have long-term impact—for instance, longitudinal studies have shown that even after 55 years of follow-up, weight status in childhood had independent association with that of adulthood.[2,3]

Previous studies for the period between the 1980s and 1990s show the prevalence of overweight and obesity in children increased dramatically by 2- to 5-folds in developed countries (e.g., from 11% to >30% in boys in Canada), and up to almost four times in developing countries (e.g., from 4% to 14% in Brazil).[4]

Increased urbanization along with rapid socioeconomic changes and nutrition transition might be considered as the main determinants of the high prevalence of growth disorders in developing communities.[5–7] Although in developed countries overweight and obesity are more prevalent than underweight, the prevalence of overweight and underweight is estimated to be the same in developing societies such as Iran.[8–10] Previous nationwide studies in Iran have indicated high frequency of such disorders, including 8.8% overweight, 4.5% obesity, and 13.9% underweight.[11] This pattern is also reported from South and West Asian populations with high prevalence of underweight in children and adolescents.[12,13]

The association between socioeconomic status (SES) and obesity has been documented among adults; however, results are conflicting in the pediatric age group.[14–16]

Childhood and adolescence are considered critical periods of rapid growth during the life span of human beings; therefore, screening, identification, and treatment of growth failure deserve ample attention in developing countries. A recent systematic review and meta-analysis conducted in Iran revealed that, although the trend in the prevalence of obesity among Iranian children is not remarkably high, the increasing trend of overweight among young children is at an alarming rate and should be considered by providers of interventional preventive programs at national and regional levels.[17] Previous results based on national data have also shown a double burden of nutritional disorders in Iran[8,11]; however, this condition is not reported according to subnational SES classification of the country. The present study aims to determine the prevalence of growth disorders in a nationally representative sample of Iranian adolescents according to the SES of their living area.

2. Methods

This nationwide survey was performed in 2011–2012 as the third phase of a national school-based surveillance program entitled Childhood Adolescence Surveillance and Prevention of Adult Non-communicable disease (CASPIAN) study.[18] Details of the current survey are published elsewhere.[19] It is based on the World Health Organization Global School-based Student Health Survey, with additional information gathered from parents. This study aims to assess the risky behaviors and risk factors among students to help the design and implementation of health initiatives in an action-oriented manner. The study participants consisted of 5624 students selected from urban and rural areas of 27 provinces in Iran. They were selected by stratified multistage random sampling. After complete clarification of the study, written informed consent was obtained from parents and oral assent from students. Anthropometric indices used for these analyses included body weight, height, and waist circumference (WC), measured by trained health professionals. Body mass index (BMI) was then calculated via the ratio of weight (kg) to height squared (m^2). Weight was recorded with the individual wearing only light clothing to the nearest 0.1 kg, and height was measured without shoes to the nearest 0.1 cm, using a portable stadiometer. WC was measured using a nonelastic tape to the nearest 0.1 cm over skin, midway between the iliac crest and the lowest rib in standing position. The definition of weight status disorders was based on the World Health Organization standard growth curves.[20] Abdominal obesity was determined using the equation WC divided by height ratio greater than 0.5.[20]