

## Original Article



## Prevalence of Overweight and Obesity among Students Aged 7-22 Years in Jiangsu Province, China\*

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### Abstract

**Objective** To report the prevalence and trend of overweight and obesity among students aged 7-22 years in Jiangsu, 2010 to 2013.

**Methods** This cross-sectional study was carried out as part of students physical fitness and health survey in Jiangsu province. A total of 255,581 subjects (50.03% males and 49.97% females) enrolled in 82 school and 10 universities in Jiangsu. Weights and heights were obtained for each subject and its body mass index (BMI) was calculated using the Chinese Working Group on Obesity in China (CWGO).

**Results** Anthropometric measurement including bodyweight, height, BMI and bust were significantly different between males in urban compared to females living rural areas ( $P < 0.001$ ). The total prevalence of overweight and obesity was 12.4% and 5.7%. Males had a significantly higher rate than in female's student. The prevalence of overweight and obesity by age groups was (14.5%, 10.3%) at age 7-11 years, (11.2%, 6.8%) at age 12-14 years, (11.7%, 3.1%) at age 15-17 years, and (11.4%, 2.3%) at age 18-22 years. By regions; the highest prevalence of overweight obesity reported in Taizhou (10.0%, 14.2%), Xuzhou (9.4%, 12.5%), and Nanjing (9.2%, 15.6%), respectively.

**Conclusion** The finding declares that overweight and obesity are important health problems among students in Jiangsu Province. Early intervention programme are needed to address this problems.

**Key words:** Body mass index (BMI); Anthropometric measures; Overweight; Obesity; Jiangsu Province; China

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### INTRODUCTION

Overweight and obesity among young people is a growing concern of public health<sup>[1]</sup>, and is associated with both physical and psychological health consequences.

Currently, the rate of obesity has increased significantly during the last decades in many countries among children and adolescents. Therefore, development of more research involving overweight and obesity, particularly in children at school age were essential to monitor the health

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status in the community<sup>[2-4]</sup>.

Obesity and overweight are seen exceptionally high among urban school children and adolescent<sup>[1,5]</sup>. Therefore, child health and growth status is globally recognized as an important indicators for child health standards<sup>[6]</sup>. Obesity has negative health consequences among populations and is a major risk factor for common diseases such as cardiovascular, stroke, diabetes and cancer<sup>[7-8]</sup>.

In particular, obesity was reported to be associated with many diseases such as development of hypertension, diabetes mellitus, coronary heart disease, certain forms of cancer, and sleep-breathing disorders<sup>[9]</sup>. Obesity was also confirmed to be associated with high blood pressure (HBP) rate due to increasing the body mass index, while both systolic and diastolic blood pressure were positively related to the body mass index, and the association between obesity and HBP remained statistically significant after adjustment of age, heart rate, smoking, alcohol intake, and physical activity<sup>[10]</sup>. Furthermore, obesity prevalence is also rapidly increasing among children and adolescents<sup>[11]</sup> although many researchers believed it in the past to be less frequently associated with increased morbidity than in adults. Obesity in children is now recognized to be associated with insulin resistance, hyperlipemia, hepatic steatosis, sleep apnea and orthopedic complication<sup>[12-13]</sup>, in adults BMI was seen to be strongly associated with body fats and the risk increased mortality<sup>[14]</sup>. Obesity was reported as to be a major contributing factor to the decline of levels of physical fitness, and the increase in risk of chronic diseases and mortality rates<sup>[15]</sup>.

In China approximately 260 million are overweight or obese adults with 30% prevalence, 50% of obese individuals are in major cities. The fast growth of the national economy in the past decades, the nutritional status of the Chinese people has improved greatly, but main dietary problems still exist such as iron deficiency<sup>[16]</sup>. However, there are still huge differences between urban and rural areas in the past several decades. Stunting was as high as 30.2% and it was the most serious problem impeding child growth and development<sup>[17-18]</sup>. A study by Australian University students showed that 1 in 4 Australians were classified as obese in 2011-2012<sup>[19]</sup>. In Italy and Sudan the prevalence (where it is high/low) of BMI among the age groups 11-15 years-old were observed<sup>[20-21]</sup>.

A study conducted in 2003 among students aged 12-14 years from eight schools in Jiangsu Province,

indicated over-nutrition as the problems due to food habits and student lifestyle. The rate of overweight and obesity were increased in schools children in Jiangsu, China<sup>[22]</sup>. Study among College students between 2009-2011 in Hebei province found that the standard rate of height and weight was quite low and the number of overweight male students was higher than that of females in the same study area<sup>[23]</sup>. However, previous large epidemiological studies indicated that about one-fifth of the one billion overweight or obese people around the world are Chinese. Therefore, the aim of the present study was to provide the most recently evaluated rates of body weight, height, BMI, bust, and prevalence of overweight and obesity in 7-22 years-old among students living in 13 cities in Jiangsu province, China, during the period from 2010 to 2013.

## MATERIALS AND METHODS

Population-based cross sectional study was conducted among students in Jiangsu province, China. During physical fitness and health surveillance from 2010 to 2013.

The study was conducted in Jiangsu province in southeast China. It covers an area of approximately 1 million km<sup>2</sup> and has a population of 73.55 million, which represents the highest population density in China. It is one of the wealthiest provinces; however, the economic status varies greatly according to regions.

Research data was obtained from Jiangsu Provincial Department of Education in Nanjing research units. A total of 255,581 subjects (127,866 male and 127,715 female) aged 7-22 years were recruited in this study from 82 primary, middle and high schools, and 10 provincial universities. Students were subdivided by gender, age groups (7-11, 12-14, 15-17, and 18-22 years), living status (urban and rural) and three socio-economic regions including North Jiangsu (Huai'an, Lianyungang, Suqian, Xuzhou, Wuxi, and Yancheng), South Jiangsu (Changzhou, Nanjing, Suzhou, Zhenjiang) and Central Jiangsu (Yangzhou, Nantong, Taizhou).

### *Anthropometric Measurements*

Self administrated questionnaire was used to collect information on socio-demographic indicators and anthropometrics measurements were carried out by well-trained health workers who followed a reference protocol. While the equipment tool was calibrated before starts anthropometrics

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