Programme and policy options for preventing obesity in China

H. Wang and F. Zhai

National Institute for Nutrition and Food Safety, Chinese Center for Disease Control and Prevention, Beijing, China

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Address for correspondence: Professor F Zhai, National Institute for Nutrition and Food Safety, Chinese Center for Disease Control and Prevention, Beijing 100050, China. E-mail: zfyz12@vip.126.com

Summary
By 2002, China’s prevalence of overweight and obesity among adults was 18.9 and 2.9%, respectively. The replacement of traditional Chinese diet with ‘Western diet’, major declines in all phases of activity and increased sedentary activity are cited as the main reasons explaining the rapid increase in overweight and obesity, which bring major economic and health costs. The Nutrition Improvement Work Management Approach was released in 2010. Overweight and obesity prevention-related policies were added to national planning for disease prevention and control. The Guidelines for Prevention and Control of Overweight and Obesity of Chinese Adults and the School-age Children and Teenagers Overweight and Obesity Prevention and Control Guidelines in China were promulgated in 2003 and 2007, respectively. Few education programmes have been implemented. Selected academic intervention research projects dominate with a focus on reducing child obesity and promoting healthier diets; increasing physical activity and reducing sedentary time; and facilitating changes in family, school, social and cultural environments. Intervention samples are small and have not addressed the increasing rates of obesity throughout the entire population. Government provision of effective policy measures, multisectoral cooperation and increasing corporate social responsibility are keys to curbing the trend towards overweight and obesity in China.

Keywords: China, interventions, obesity.

Introduction
Overweight and obesity have become major public health problems in China. Although China’s rapid economic growth has led to changes in dietary and physical activity (PA) patterns (1–6), large inequalities remain as the burden of obesity has shifted markedly to the lower-educated population (7), and it is common to see problems of underweight, stunting and micronutrient deficiencies, even with the prevalence of overweight and obesity increasing (8–13). In the past decades, obesity has increased dramatically in all age groups. With a higher prevalence of nutrition-related chronic diseases, a younger age of onset and increasing medical costs, overweight and obesity have become major public health problems and important disease burdens in China (14–21). Prevention and control of overweight and obesity are of great urgency for China.

The China National Nutrition and Health Survey (CNNHS) data in 2002 indicated that the prevalence of overweight and obesity among adults was 18.9 and 2.9%, respectively. Between 1992 and 2002, the prevalence of overweight and obesity among adults increased by 39.0 and 97.2%, respectively (22,23). Chinese people have a
higher percentage of body fat compared with Westerners at the same body mass index (BMI) (24,25), therefore Chinese classifications of BMI ≥ 24 for overweight and ≥28 for obesity have been recommended based on the data of the Chinese national survey, raising overweight and obesity to 22.8 and 7.1%, respectively (8,23). China Health and Nutrition Survey (CHNS) data indicated a BMI increase of 1.2 in adults between 1993 and 2009, with an increase of 67.0% in the prevalence of overweight, from 9.4 to 15.7%, and an increase of 168.0% in the prevalence of obesity, from 4.0 to 10.7% (13,26,27). The prevalence of obesity increased faster among men than among women, with the prevalence equal in 2004 and higher in men thereafter. The epidemiology of obesity among northeastern urban adults also showed that men had a higher overweight and obesity prevalence than women.

Chinese people are predisposed to central body obesity. Several studies have found that waist circumference (WC) or waist-hip ratios might be more sensitive indexes for obesity in China though some studies show both BMI may be more predictive than WC (28–30). Central obesity is associated with a higher risk of incident hypertension. Approximately two-thirds of the individuals with obesity would be overlooked if WC were not measured. It is therefore urgent to emphasize the importance of WC as a measurement to monitor the prevalence of obesity in China (8,26,31,32). This issue is amplified by the rapid increases in WC found at each BMI level in new research (Stern et al., unpublished data, see also (33)).

Children in China are also getting fatter. The increasing prevalence of child and adolescent overweight and obesity was documented in the CNNHS in 1992 and 2002. These surveys reported that in 2002 the prevalence of overweight and obesity in those aged 7 to 17 years was about 6% using either the WHO or the Chinese classifications and that it was much higher than in 1992 (34). A similar trend was reported by the Chinese National Surveillance on Students’ Constitution and Health (CNSSCH), which showed that by 2000 the prevalence of childhood overweight and obesity in the coastal cities had reached the average level found in more developed areas (35). The CHNS reported that the prevalence of overweight and obesity in children aged 7 to 17 using International Obesity Task Force cutoffs increased from 5.2% in 1991 to 13.2% in 2006. The greatest increase occurred among male children (36). Some provinces, e.g. Shanghai, Beijing and Shandong, showed the same trends in the prevalence of overweight and obesity among both urban and rural adolescents. In 2000, the prevalence of overweight and obesity in 7- to 12-year-olds approached to 29% in boys and 15–17% in girls (37–41). The epidemic of childhood and adolescent obesity represents the greatest health challenge, because the condition continues into adulthood.

**Increasing chronic disease and its economic burden**

Rapidly increasing overweight and obesity in China will undoubtedly continue to push up the prevalence of chronic disease (15,18). The 2002 CHNS indicated that, compared with those with a normal BMI, the odds ratio (OR) for adult hypertension and diabetes was 2.3 among the overweight and 4.0–5.0 among the obese. For overweight and obese adolescents, the OR of having hypertension was 3.3 and 3.9, respectively, and their average systolic blood pressure and diastolic blood pressure were about 10 and 5 mmHg higher than those of normal weight adolescents (30,42). A 10-year cohort study showed that the relative risk for coronary heart disease and ischemic stroke was 1.3–2.0 (43).

The increased prevalence of chronic diseases has increased their burden on the economy, and they have become the most important economic burden in China. According to the results of the third Health Services Demand Survey in 2003, the direct medical costs attributable to overweight and obesity amounted to RMB 21.1 billion Yuan (equivalent to US dollars $2.74 billion), which is one-fourth of the total direct costs of hypertension, diabetes, coronary heart disease and stroke (14). The proportion of medical costs attributable to chronic diseases increased from 54% in 1993 to 63% in 2005. In 2009 the WHO reported that it was about 69% in China (44).

Clearly the future economic burden of obesity will be appalling unless timely action is taken. Nevertheless, China faces a double nutrition problem. As the government tries to decrease malnutrition, it must also control overweight and obesity. The Ministry of Health is planning a national framework for the prevention of chronic diseases with a particular focus on the prevention of overweight and obesity.

**Explaining the rapid increase in overweight and obesity**

Because of earlier experiences with long-term poverty and famine, the Chinese traditionally believe that fatness is a sign of happiness and abundance. These traditional beliefs have not kept pace with the socioeconomic changes that have led to a more secure food supply, overconsumption and energy imbalance (45). In addition, because of the one-child policy, the single child is the focus of attention for the whole family, which may contribute to the overfeeding of children.

Body fat increases when energy intake is consistently greater than energy expenditure. Excess body fat and obesity are the result of sustained positive energy balance. In the past 20 years, China has seen a massive decrease in daily PA and calories expended, but without a decrease in food intake (5,6,8,46,47).
Large shifts in access to technology have reduced work-related energy expenditures in labour-intensive occupations (48,49). For example, agricultural machinery has reduced both labour intensity and labour time. More people work in the less energy-intensive sectors, such as service and manufacturing. Changes in transportation (50), leisure activities and work in the home, such as cleaning, cooking, and child care, have also reduced PA (49). Moreover, children’s PA levels have also decreased. Under great pressure to achieve scholastically in addition to being the focus of the family, they do not perform household chores. After school, Chinese adolescents spend their time on homework instead of gymnastic exercises and sports, and school and extracurricular physical activities are almost non-existent (51,52).

Chinese diets have changed vastly. The traditional diet, in which plant foods were given priority, has been replaced by the ‘Western diet’, which is broadly defined by a high intake of refined carbohydrates, added sugars, fats and animal-source foods (6,13). From 1989 to 2011, adults’ daily vegetable oil consumption increased from 30 to 37 g (2), pork consumption increased from 48 to 69 g, and cereal consumption decreased from 600 to 420 g. With these food consumption changes, the daily adult fat intake increased from 76 to 81 g, and the percentage of energy coming from fat increased from 23.6 to 35.9% (2). Children like to drink sugar-sweetened beverages (SSBs) and eat fast food (10,53–55). In 2002, SSBs were consumed regularly by 46.1% of Chinese children (56). In response to the effective advertising of SSB producers and fast food giants, such as McDonald’s and Kentucky Fried Chicken, Chinese children are devouring more of those foods than ever before (10). The first McDonald’s restaurant opened in China in 1990, and now there are more than 1,000 McDonald’s in 25 provinces. Consequently, fast food consumption has increased faster than expected.

**Government planning to halt obesity in China**

About 10 years ago, the Chinese government began to realize the importance of obesity control and to play a leading role with laws and regulations aimed at obesity prevention. Programme and policy options for the prevention of obesity are the key measures that should be started during childhood. The most effective strategies need government support, the cooperation of organizations and the participation of the entire society.

The Ministry of Health released the Nutrition Improvement Work Management Approach in 2010 to promote national nutrition initiatives and to enhance the nutrition and health status of Chinese residents. Relevant nutrition improvement work includes nutrition surveillance, education, guidance and intervention. In 2009, the State Council of China issued national fitness regulations that have improved the level of PA (57).

Overweight and obesity prevention-related policies, as part of the public health policies, were added to national planning for disease prevention and control. The 12th 5-Year Plan for National Economic and Social Development objectives to improve life expectancy among 1-year-olds, actively prevent chronic diseases, popularize health education and implement the national health action plan reflect the government’s attention to the prevention of obesity and related chronic diseases. Healthy lifestyle initiatives begun in 2012 will cover more than 50% of Chinese communities by 2015 with the goal of reducing the prevalence of obesity to less than 12% in adults and less than 8% in children by 2015.

**Obesity prevention and control guidelines**

In 2003, the Chinese Bureau of Disease Control in the Ministry of Health promulgated the Guidelines for Prevention and Control of Overweight and Obesity of Chinese Adults. As noted earlier, there is a higher disease risk with central body obesity, and Chinese people have a higher percentage of body fat compared with Westerners at the same BMI. Based on the Chinese data and analyses of the disease risk associated with overweight and obesity, the bureau selected BMIs of 24 and 28 kg m⁻² as the definitions of overweight and obesity, respectively, for Chinese adults (8,30). The WCs for central obesity were defined as 85 cm for men and 80 cm for women (30).

In 2007, the Bureau of Disease Control published another important document, the School-age Children and Teenagers Overweight and Obesity Prevention and Control Guidelines in China. The data from the large-scale 2000 CNSSCH with 216,620 students provided the reference population for the guidelines, and cutoffs at 85th percentile/95th percentile (P85/P95) were determined as the most suitable set (58).

Other overweight and obesity prevention and control guidelines were issued as well. For example, the Chinese nutrition society revised the Chinese dietary guidelines in 2007 to focus on chronic disease prevention. The Guidelines on Snacks for Chinese Children and Adolescents were published in 2008 and the Chinese Adults’ Physical Activity Guidelines in 2010. The Principles of the Pre-packaged Food Nutrition Labels identified the nutrient information that should be included on labels to help consumers make healthier food choices in 2013. Chinese Dietary Reference Intakes, originally published in 2000, are undergoing revisions that will be issued in 2013. The new revisions bring attention to chronic disease prevention. All these guidelines can help the Chinese form good diet and exercise habits.
Current experiences and major initiatives

Although the government has designed policies and guidelines to control the rapid growth of overweight and obesity through health education activities, only a small number of education programmes have been implemented. Moreover, evaluation of the effectiveness of the education programmes is lacking because of their short duration. Most of the intervention research information stays in the academic field, and there is a need for strong government measures, such as creating a healthy food environment at schools, restricting fast food advertising and requiring nutrition labelling on food.

In 2007, the Ministry of Health launched the 121 Health Action strategy of ‘ten thousand steps a day, the balance of eating and activity and a healthy life’. The programme aims to encourage a reasonable diet and a moderate level of PA as the keys to preventing overweight and obesity, to disseminate and promote healthy lifestyle concepts, to promote technical and educational tools, and to fulfill the various national health plans.

In 2010 the Ministry of Health established the chronic disease comprehensive prevention and control demonstration areas, which direct care and prevention interventions at the community level. With the government leading, the areas organize whole society participation and multispectral actions to control chronic diseases and decrease individual risk. Through health education and promotion, early detection and treatment, and standardized management, the areas reduce the economic burden of chronic diseases. To date, 140 counties in 30 provinces have become national-level demonstration areas. Two years of PA intervention have proven that comprehensive and evidence-based interventions can significantly improve the levels of subjects’ PA and improve related body measurement and biochemical indicators.

A large number of intervention programmes have been initiated or were ongoing in the past 10 years. Prevention and treatment of obesity and overweight may be easier in children than in adults, because children are still growing in height and their behaviours and lifestyles are still developing. Most of the programmes focus on reducing child obesity, and the most commonly adopted interventions include promoting healthier diets, increasing PA and reducing sedentary time, which usually involves reducing TV viewing; providing health education and counselling; and facilitating changes in family, school, social, and cultural environments to address the wider determinants of obesity. In a sense, these projects are research with the objective of finding the effective comprehensive interventions to control overweight and obesity. Because the sample sizes of the interventions are small, they cannot reverse the increasing rates of obesity throughout the entire population. Take Ten is a school-based study of PA interventions for obesity in primary school. Activities organized by teachers occur in class, either indoors or outdoors, are carried out at least once every weekday for 10 min each time, and include simple exercises or more interesting activities. Take Ten started with a pilot study in Beijing in 2004, and results were sufficiently clear that in 2010 the intervention was expanded to more than 50 primary schools in Beijing and nine other cities and provinces, including Shanghai, Tianjin and Chongqing. The results indicate that the Take Ten model is effective in primary schools (59–61). A new policy of one hour of PA in schools every day was released by the Department of Education in 2011. In Shandong Province 29,030 students aged 10–18 years participated in a study of this policy. The results indicate that one hour of PA every day has a beneficial effect in preventing obesity in adolescents (62). These observations highlight the importance of PA in the prevention of overweight and obesity in adolescents.

Because obesity among children is relatively higher in Beijing, Shanghai and Jiangsu, those local governments have given special attention to childhood obesity prevention, and according to their local characteristics, have carried out several school-based childhood obesity interventions. The school provides an ideal opportunity in terms of both the physical and the social environments for preventing obesity. Therefore school-based obesity interventions have been applied worldwide as well as in China. An ongoing school-based comprehensive lifestyle intervention among Nanjing kids to prevent obesity was tested from 2010 to 2013. Students in the control group followed their usual health and physical education curriculum with no additional intervention programme. A multicomponent programme was implemented with the intervention group. The intervention consisted of four components: first, a classroom curriculum including physical education and healthy diet education; second, school environment support including student presentations of brief health-related messages and posters they had made; third, family involvement, as parents and guardians are the gatekeepers of their children’s food choices and also serve as role models by practicing and reinforcing healthy lifestyle choices; and fourth, fun programmes and events. The intervention did its best to gain the support of educational authorities, school administrators, teachers, and parents, and to integrate intervention components into the schools’ regular academic programmes (63). Beijing, Shanghai, and other provinces and cities have conducted many childhood obesity intervention studies. Although the child overweight and obesity prevalence still increased rapidly in these cities, the intervention studies for childhood obesity control provide useful groundwork for future interventions.
Problems and future options

Government’s leading role

In this time of dietary structure changes and rapid growth of overweight and obesity, the government should provide effective policy measures to curb the trend towards overweight and obesity. Over the past decade, several obesity control policy measures and technology guidelines have been developed. Building on previous work, the current focus is on drafting a national obesity prevention and control action plan. A key public health issue calls for the whole society to pay attention to diet and PA and accept an important role in obesity prevention. A nationwide campaign should address changing the food environment and lifestyles, including promoting PA, establishing meal and obesity guidelines, implementing health education and early intervention programmes, and limiting sweet drinks at school. Increased capital investment can ensure that communities develop healthy environments. Taxation can be a means to reduce the intake of unhealthy foods, such as SSBs and fast foods; to lower healthcare costs; and to generate revenue that governments can use for health programmes (13).

To date, there is minimal evidence that the obesity increase in China is slowing down. Clearly major action at the national and provincial level in areas of regulations and taxation are important weapons that the government must begin to consider using. To date, little has changed in the food environment. There are no policies regarding marketing of food via television and all other media, there are no front of package or other labelling system to profile the healthier foods among the many thousands that are now found in supermarkets and convenience stores that dominate the Chinese food system, little has been done to control the rapid increase in consumption of sugary beverages in both government institutions such as schools and hospitals, let alone across society, and fiscal taxation and other ways to shift consumption towards healthier foods is nonexistent.

Multisectoral cooperation

Medical and health care, food, agriculture, education, business, finance, traffic, environment, culture, media and other departments work together to support a healthy environment to reduce and control obesity susceptibility. For example, in the field of media, regulation of food advertising and nutrition labelling have the potential to encourage the food industry to supply healthier foods (64). This requires strong government regulatory action.

Corporate social responsibility

As the economy grows and society prospers, enterprise should be not only responsible for profit, but also be environmentally and socially responsible. Health promotion is among the social responsibilities of enterprise. Food companies should provide healthy food to protect and promote customer health. They should use simple, clear labels with accurate health claims and end the misleading food advertising that affects the diets of children and teenagers. To date, there is little evidence that Chinese food companies consider the healthfulness of their products, let alone show any willingness to assist in efforts to curb obesity.

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Conflicts of interest

None.

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