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Review Essay

Overweight, obesity, and inactivity and urban design in rapidly growing Chinese cities



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ABSTRACT

China faces rising rates of overweight, obesity, and physical inactivity among its citizens. Risk is highest in China's rapidly growing cities and urban populations. Current urban development practices and policies in China heighten this risk. These include policies that support decentralization in land use planning; practices of neighborhood gating; and policies and practices tied to motor vehicle travel, transit planning, and bicycle and pedestrian infrastructure. In this paper, we review cultural, political, and economic issues that influence overweight, obesity, and inactivity in China. We examine key urban planning features and policies that shape urban environments that may compromise physical activity as part of everyday life, including walking and bicycling. We review the empirical research to identify planning and design strategies that support physical activity in other high-density cities in developing and developed countries. Finally, we identify successful strategies to increase physical activity in another growing, high-density city – New York City – to suggest strategies that may have relevance for rapidly urbanizing Chinese cities.

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1. Introduction

China is experiencing unprecedented rates of urbanization. In 2011, the Chinese urbanization rate reached 51.3%. Urban residents surpassed rural residents in number for the first time in China's history (China Population and Development Research Center, 2012). Urbanization is predicted to increase to nearly 60% by 2020, and to more than 70% by 2030.

China's urbanization involves environmental, economic, and social changes that increase risk for overweight, obesity, and physical inactivity. Development in major cities has dramatically transformed China's built environment in ways known to impact health in Western contexts. Chinese urbanization patterns have so far produced sprawling development; lower densities; transportation infrastructure that emphasizes driving over bicycling or walking; environmental pollution; and an often inconvenient, unsafe, and unpleasant public realm that discourages walking and bicycling (cf. Bell et al., 2002; Burdett and Sudjic, 2010; Campanella, 2008; Friedmann, 2005; Hou et al., 2004; Hsing, 2010; Li et al., 2007; Song and Ding, 2009).

The issues of physical inactivity, overweight, and obesity are not unique to China. To address these issues, Chinese cities may be able to draw lessons from empirical research and from planning practices that link the design of built environments to physical activity in other developing and developed countries. New York City, in particular, is an international leader among cities that successfully promote "active living". Active living involves physical activity as a part of daily life, especially through walking and bicycling for transportation and recreation. Cities can support active living by encouraging "active design". Active design involves the creation of building, street, and neighborhood environments that support active transportation such as walking and bicycling, active recreation, and physical activity in buildings such as stair and ramp use, along with other physical activity. Active design strategies include well-designed sidewalks, bike lanes, and transit connected to pedestrian and cycling amenities; mixed uses (providing destinations to walk or bicycle to, near home and work); and high street connectivity (making it convenient to walk or bicycle directly between destinations). These and other strategies may have relevance for Chinese cities.

In this paper, we address the following questions:

- (1) What factors contribute to the rise in overweight, obesity, and inactivity in China's rapidly growing cities, focusing on changes to the urban environment that may impact active living?

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- (2) What can we learn from existing research and from urban planning practice about how to support active living through active design in Chinese cities?

To address the first question, we reviewed scholarly literature in urban planning and related fields to identify cultural, political, environmental, and economic factors that may impact overweight, obesity and inactivity in China. We searched recent journal articles, reports, and web sites in English and Chinese that examine transportation, urban design, and development in Chinese cities, especially tied to walking and bicycling. Our literature review includes empirical papers reporting associations between built environmental features and obesity or inactivity in China. We also include papers that report rates and changes in various built environmental features in China. We identify such features as possible contributing factors to declining physical activity rates. Studies empirically testing these links are needed to support our hypotheses about these connections. Our literature review was focused rather than exhaustive. We emphasized literature since the year 2000, associated with the recent, rapid development in Chinese cities. The search was guided by our expertise on active living research and on urban planning in China.

To address the second question, we examined empirical research from other high-density cities in rapidly urbanizing countries to identify planning and design strategies that support active living. We also investigated the specific case of New York City, which is one of the leaders among large, high-density, growing cities that aggressively promote active design. We identify possible strategies from New York City that may be relevant for Chinese cities.

The following section provides background on increasing overweight and obesity in Chinese cities and identifies reasons for this increase, including declining rates of physical activity.

2. Overweight, obesity, and inactivity in Chinese cities

Among health conditions, overweight and obesity are of growing concern in China. Over 25% of adults in China are overweight (Popkin, 2008). Another 3% of the population is obese (body mass index ≥ 30) (Prentice, 2006).¹ These numbers fall short of corresponding rates in the USA—where 68% of residents are either overweight or obese and 34% are obese. It also falls short of rates in other Western countries (Ogden and Carroll, 2010). Yet China's rapid rise in obesity and the number affected raise serious concern. Between 1989 and 2000, obesity rates doubled among women in China and tripled among men (Popkin, 2008). Today, one-fifth of all overweight or obese people in the world are Chinese (Wu, 2006).

Overweight and obesity prevail among China's urban residents. Both adults and youth suffer, especially in more affluent households (Gui et al., 2010). The prevalence of childhood overweight in China's coastal cities is similar to that in developed countries. Overweight children are two times more likely to become overweight adults, compared to normal weight children. Childhood obesity contributes to cardiovascular disease and type 2 diabetes later in life (Gui et al., 2010).

¹ Some Asian populations, including Chinese people, face increased health risks from overweight and obesity at lower BMI levels, compared to Western populations (Gui et al., 2010; Nishida, 2004). The same BMI may reflect a higher percentage of body fat among Chinese populations, compared to white or European populations.

2.1. Causes of overweight and inactivity in China

Multiple factors explain the increase of overweight and obesity among Chinese city residents. Among urban, affluent populations, diets have shifted towards Western norms and now include more fat and more animal-based products and energy-dense food (Gui et al., 2010; Reynolds et al., 2007). Cultural attitudes towards overweight in China – specifically, the association of fatness with prosperity and health – may make being overweight socially acceptable (Wu et al., 2005). Additionally, China's "one-child" policy focuses parents' and grandparents' attention on a single child, which may encourage spoiling children (especially boys) with food (Gui et al., 2010; Markey, 2006; Suarez, 2010).

Declining physical activity rates are one major cause of overweight and obesity in Chinese cities. Physical activity in China has declined rapidly since the 1980s (Food and Agriculture Organization of the United Nations, 2006). Between 1991 and 2006, the average weekly rate of physical activity dropped by approximately 32% among adults (Ng et al., 2009), according to longitudinal data from the Chinese Health and Nutritional Survey of residents in nine Chinese provinces. For men, self-reported occupational, domestic, transportation, and leisure physical activity, fell from 350 MET (metabolic equivalent) hours per week in 1997 to 253 MET hours per week in 2006.² Women's physical activity declined from 390 MET hours per week in 1996 to 246 MET hours in 2006. Explanations for this decrease include increased workplace technology, fewer jobs requiring heavy labor, shifts to passive versus active commuting, and changing leisure activities (Bell et al., 2002; Hou et al., 2004; Food and Agriculture Organization of the United Nations, 2006). Chinese urban residents are less active than their rural counterparts. In an in-person survey of self-reported physical activity, 22% of urban residents report being physically active and 8% participate in leisure-time physical activity, compared to 78% and 29% of rural residents (Muntner et al., 2005).

The impacts of overweight and inactivity have historically received limited attention in China and in other developing countries (Bekedam, 2006). Today, several local governments in China are adopting measures to improve public health and to address overweight and inactivity (Hujun, 2008). Efforts focused on education, information and awareness alone may have limited or no impact, however, without a comprehensive approach that also includes planning and policy supports for active living (Kahn et al., 2002).

The following section discusses planning and design policies and practices in Chinese cities that limit opportunities for active living, including China's large-scale urbanization patterns; decentralized land use planning; neighborhood gating practices; and policies and practices regarding motor vehicle travel, transit, and bicycle and pedestrian infrastructure.

3. (In)active design in major Chinese cities

3.1. Chinese large-scale urbanization

China's urbanization rate since the launch of economic reform has been phenomenal. From 1990 to 2000, approximately 200 million Chinese became urban residents, raising the urban population to 622 million—the same size as all of Europe excluding Russia (The State of China's Cities, 2010). By 2025, China will add another 350 million urban residents—more than the United

² A MET unit is the ratio of a person's working metabolic rate relative to his/her resting metabolic rate (Sallis et al., 1998).

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