

Urbanization and the prevalence of schizophrenia in China between 1990 and 2010

Among the environmental risk factors for schizophrenia, evidence supports a role of urbanicity (1-3). In recent decades, urbanization has been occurring at a massive scale in low- and middle-income countries (4,5). It is therefore of global public health importance to explore how rapid urbanization might have affected the burden of schizophrenia in growing economies, with China being a prime example.

Epidemiological evidence in China has improved over the past two decades and Chinese academic journals have become accessible in electronic databases (6). Moreover, China recently underwent urbanization and economic development at an unprecedented scale: 26.4% of its 1.1 billion inhabitants lived in urban areas in 1990, rising to 49.2-49.7% of 1.3 billion in 2010 (4,7). We may expect a significant increase of schizophrenia burden in China as a result.

To explore this, we conducted a systematic review of the Chinese and English literature, through China National Knowledge Infrastructure, Wanfang and PubMed, for the years from 1990 to 2010. Only studies that had applied a case definition based on DSM-III or IV, ICD-9 or 10, or Chinese Classification of Mental Disorders (CCMD-2, 2R or 3) were retained.

Based on pre-defined minimum quality criteria, 42 prevalence studies were selected. They were mostly large population-based studies, typically using a two-stage data collection design in which trained assessors performed an initial screening and psychiatrists followed up with a detailed evaluation. Direct contact was made with the corresponding authors of 13 studies to obtain any missing information. Geographically, the retained studies covered 21 of mainland China's 31 provinces, municipalities and autonomous regions. Bayesian methods were applied to predict maximum likelihood for point prevalence and lifetime prevalence in urban and rural China in the years 1990, 2000 and 2010.

The analyses of the 42 studies combined information from 2,284,957 people, 10,506 of whom were diagnosed with schizophrenia in their lifetime. In urban areas, the point prevalence (≥ 15 years) of the disorder was 0.32% (95% CI: 0.29-0.36) in 1990, 0.47% (95% CI: 0.44-0.50) in 2000, and 0.68% (95% CI: 0.57-0.81) in 2010. In contrast, in rural areas, the corresponding estimates were 0.37% (95% CI: 0.33-0.42), 0.36% (95% CI: 0.35-0.38), and 0.35% (95% CI: 0.33-0.38). Lifetime prevalence (≥ 15 years) in urban China was 0.39% (95% CI: 0.37-0.41) in 1990, 0.57% (95% CI: 0.55-0.59) in 2000, and 0.83% (95% CI: 0.75-0.91) in 2010. The corresponding estimates for rural areas were 0.37% (95% CI: 0.34-0.40), 0.43% (95% CI: 0.42-0.44), and 0.50% (95% CI: 0.47-0.53).

Applying these prevalence estimates to the corresponding population of China, there were 3.09 (95% CI: 2.87-3.32) million persons affected during their lifetime in the year 1990. Twenty-seven percent of the cases were from urban areas, which corresponds to the overall proportion of urban residents in China in the same year (26.4%). By 2010, the number of persons affected with schizophrenia rose to 7.16 (95% CI: 6.57-7.75) million, a 132% increase, while the total population of China only increased by 18% during this period (4). Moreover, the contribution of expected cases from urban areas to the overall burden increased from 27% in 1990 to 62% in 2010, well above the proportion of urban residents in China in 2010 (49.2-49.7%).

This study helps to establish the universality of urbanicity as a risk factor and the extent to which it affects the burden of schizophrenia in a large country that underwent rapid urbanization. As schizophrenia prevalence was found to be similar in rural and urban China at the beginning of industrialization (late 1980s) (8), our findings suggest that the mechanisms driving the risks of illness in urban areas are likely to be associated with modern urban lifestyles. The lower rates of schizophrenia found when China was less industrialized are consistent with studies that reported lower rates of the illness in low- and middle-income countries (3).

This analysis has broad implications. Many populous parts of the world, particularly in low- and middle-income countries, are undergoing urbanization at a scale and rate that took Western countries centuries to achieve (9). Global urbanization may therefore result in an increased global prevalence of schizophrenia through mechanisms that need to be further explored.

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