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Body mass index and socio-economic circumstances in China: people and places matter

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Abstract
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Body mass index and socio-economic circumstances in China: people and places matter

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Background Rapid economic transition has been cited as a driving force behind China's escalating obesity epidemic. Yet it is unclear whether obesity remains a so-called '*disease of affluence*' or if trends are converging towards the negative socio-economic gradient more commonly observed (e.g. in the US). The purpose of this study was to examine the association between body mass index (BMI) and socio-economic circumstances (SEC) measured for individuals and the areas in which they lived.

Methods BMI was derived from objectively-measured height and weight for 16,065 adults aged 18 and older in the China Chronic Disease Risk Factor Survey in 2010. Individual-level SEC was measured by the highest educational qualification achieved by each participant (none, primary school, secondary school, university). Area-level SEC was measured using the mean years of education accumulated among residents of each county. Single and multilevel linear regression were used to disentangle the influence of area-level SEC from individual-level SEC on BMI, adjusting for potential mediators (dietary factors and physical activity) and sources of confounding (age, gender, urbanisation and region).

Results The mean BMI was approximately 24 (the lower threshold of 'overweight', by Chinese standards). A single-level model indicated positive association between BMI and individual-level SEC (e.g. university coefficient 0.28, 95% CI 0.07, 0.49). Fitting random intercepts, however, revealed approximately 10.6% of the variation in BMI could be attributed to geographical factors. This switch to a multilevel model also resulted in the inversion of the previously observed association between BMI and individual-level SEC (e.g. university coefficient -0.30, 95% CI -0.53, -0.08). Adjustment for area-level SEC demonstrated as positive association between BMI and the mean years of education in a county (coefficient 0.29, 95% CI 0.21, 0.37). An interaction term showed participants with low SEC and living in a high SEC county (i.e. relatively deprived) had a higher BMI than other low-SEC persons living in a lower SEC county (i.e. contextually similar). In contrast, participants with higher individual-level SEC appeared to be uninfluenced by the SEC of their surroundings. These patterns of BMI by area- and individual-level SEC were robust to adjustment for mediators and confounders.

Conclusion The association between BMI and individual-level SEC in China is modified by the SEC of where people live. Future work on obesity in China needs to consider psychosocial mechanisms (e.g. relative deprivation) as well as materialistic pathways. People with low SEC, living in higher SEC counties, should be targeted for obesity prevention interventions.