The association between area-based deprivation and change in body mass index over time in primary school children: a population-based cohort study in Hampshire, UK

Authors: Abbie Twaits, Nisreen A Alwan

Abbie Twaits- MSc, (Early Career Researcher)

Hampshire County Council, Winchester, Hampshire, UK

Dr Nisreen A Alwan- PHD

Academic Unit of Primary Care and Population Sciences, Faculty of Medicine, University of Southampton, Southampton, UK

Correspondence to:   
Abbie Twaits

Public Health Intelligence Analyst

Public Health

Elizabeth II Court West

Hampshire County Council

Winchester

SO23 8UJ

UK

[abbie.twaits@hants.gov.uk](mailto:abbie.twaits@hants.gov.uk)

Abstract:

Background

Childhood obesity is a serious health challenge. Cross-sectional evidence indicates the burden of obesity impacts most on more deprived children, yet longitudinal research is lacking. We aimed to assess the association of home-based and school-based deprivation indices with change in childhood body mass index (BMI) z-score and BMI status over 6 years.

Methods

This cohort study linked the National Child Measurement Programme data for Hampshire children aged 4-5 years (in 2007/08-2009/10) through to 10-11 years. The dataset was analysed in two groups; 18,733 children where home deprivation quintiles remained constant, and 6,153 children who moved home-based deprivation quintile over time.

The relationships between Index of Multiple Deprivation quintiles and change in BMI z-score and status, defined using the British 1990 Growth Reference, were analysed using multiple linear regression and multinomial logistic regression, respectively, adjusting for age, sex, ethnicity and school Ofsted status.

The University of Southampton granted ethical approval.

Findings

63.7% of children remained a healthy weight (n=11,924), 3.1% remained overweight (n=585), 5.3% remained obese (n=990), 8.3% became overweight (n=1,560) and 10.3% became obese (n=1,921).

Children living in the most deprived quintile increased their BMI z-score by 0.13 units more than those in the least deprived quintile (95%CI:0.08-0.19). There was no significant difference for school-based quintiles (0.00units CI:-0.07-0.06).

Children attending school in the most deprived quintile were significantly more likely to remain obese and become obese (relative risk (RR)1.93 CI:1.53-2.44 and RR1.90 CI:1.55-2.32, respectively). Home-based deprivation quintiles displayed stronger associations with change in BMI status than school-based quintiles: remain obese: RR2.23 CI:1.78-2.79, become overweight: RR1.36 CI:1.16-1.60, become obese: RR2.42 CI:2.08-2.81. Moving home to a more deprived quintile was only associated with becoming obese (RR1.22 CI:1.04-1.43).

Interpretation

In Hampshire, home-based deprivation level is more strongly associated with negative change in childhood adiposity than school-based deprivation level. Although schools provide ample opportunities to deliver interventions, focus should not be lost on the obesogenic home environment. This study used robust measures and analysis using a large sample size. However, consideration of familial influences of obesity is paramount. Further research of the obesogenic environment is required, combining individual and area-based measures.

Word count: 348

Acknowledgements

We would like to express gratitude to Dr Sallie Bacon, Director of Public Health at Hampshire County Council, for allowing use of the data set for this research project and for the support in completing the MSc in Public Health. We thank Dianna Smith for her support in geographical analysis.

Contributors

AT and NAA developed the study concept and research questions. AT analysed and interpreted the data, and wrote first draft of the abstract. NAA provided supervision for the analysis and interpretation of data. Both authors contributed to subsequent drafts of the abstract and approved the final version.

Declaration of interests

We declare that we have no conflicts of interest.

Funding

MSc Public Health funded by Health Education England-Wessex. The funding source had no role in writing the manuscript or in the decision to submit it for publication. There has been no payment for writing this article by any agency. As the corresponding author, Abbie Twaits had full access to the data in the study and had the final responsibility for the decision to submit for publication.