Proceedings of the Nutrition Society (2023), **82 (OCE4)**, E243 doi:10.1017/S0029665123003191

Irish Section Conference 2023, 14–16 June 2023, Understanding the role of sex and gender in nutrition research

Associations of sociodemographic factors and obesity in children: Insights from the hyperglycaemia and adverse pregnancy outcome Belfast study

L.D. Devine[1], A.J. Hill[1], A.M. Gallagher[1], C. Patterson[2] and D.R. McCance[3]
[1]*Nutrition Innovation Centre for Food and Health, School of Biomedical Sciences, Ulster University, Coleraine, UK,*
[2]*Centre for Public Health, Queen's University, Belfast, UK and*
[3]*Regional Centre for Endocrinology and Diabetes, Royal Victoria Hospital, Belfast, UK*

The prevalence of childhood obesity has increased significantly and is now recognised as one of the most urgent public health challenges[(1)]. This issue is particularly prevalent within the UK, with childhood obesity rates increasing 4.5% during 2019–2021[(2)]. The complexity of childhood obesity is well-established, with a combination of dietary, lifestyle, environmental and social factors contributing to the aetiology[(3)]. This study aimed to examine the associations between sociodemographic factors, diet and obesity in a cohort of children in Northern Ireland.

Secondary analysis was conducted on data collected as part of the Belfast cohort of the Hyperglycaemia and Adverse Pregnancy Outcome (HAPO) study[(4)]. The HAPO study was a prospective observational study aiming to examine the associations between maternal hyperglycaemia during pregnancy and adverse pregnancy outcomes. Subjects in this study were the offspring (n = 706) of women recruited during the third trimester between 2001 and 2006 who were invited back with their offspring at 12-years postpartum for detailed metabolic anthropometric, biochemical, lifestyle, sociodemographic and dietary intake measurements. Participant postcodes were used to provide a maternal small area level deprivation score obtained using the Northern Ireland Multiple Deprivation Measure (NIMDM) tool[(5)] to yield a score between 1 (most deprived) and 4,537 (least deprived) and were divided into quintiles. Maternal education and smoking status information were obtained via a questionnaire administered to mothers at the 12-year postpartum follow-up visit. Dietary data were collected via a 3-day semi-quantitative food diary completed by the child and analysed using Nutritics Nutritional Analysis Software (v5.74) to generate quantitative nutrient data. BMI SDS were calculated to determine BMI status and children were categorised as underweight (<-2SDs), normal weight (>-2–0.99SDs), overweight (>1-<2SDs) or obese (>+2SDs)[(6)]. Statistical analysis was conducted using one-way ANOVA and chi-square test for trend.

Participants were aged 12.0 years (range 10.1–13.8, SD 0.862) with 50.4% girls (n = 353) and 49.6% boys (n = 348). 35% of girls and 23% of boys were classified as overweight or obese. Differences were noted between maternal area level deprivation scores and children's BMI SDS ($p = 0.014$), sum of skinfolds ($p = 0.002$), midpoint waist circumference ($p = 0.007$) and body fat (%) ($p < 0.001$), indicating higher numbers of obese children in the most deprived areas ($p = 0.045$). Differences were also observed between area level deprivation score and maternal smoking status ($p < 0.001$) and education ($p < 0.001$) at 12-years. No differences were noted in children's nutritional intakes across area level deprivation scores.

This secondary analysis shows differences in maternal small area deprivation scores, with increased rates of overweight and obesity among children in areas of higher deprivation. Further research to assess food choice and dietary patterns among children across all deprivation groups is warranted to aid in the development of targeted interventions to reduce obesity levels and minimise health inequalities in children.

Acknowledgments

The authors thank the women and offspring who took part in the HAPO Belfast cohort study and also the research midwives/ nurses who collected the data. This study was conducted as part of a PhD scholarship funded by the Department for the Economy (DfE)

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Article updated on 15 September 2023.