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Nutrition in preschool children and later risk of obesity: a systematic review and meta analysis

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Objectives and study: Nutrition in infants and preschool children has been suggested to influence the risk of later obesity. However, the evidence for this association is conflicting and few studies have investigated this prospectively or considered the role of energy and specific macronutrients. Here we report a systematic review and meta-analysis of studies that tested the hypothesis that nutrition in the preschool period, between the ages of 6 months and 3 years, is associated with later obesity risk.

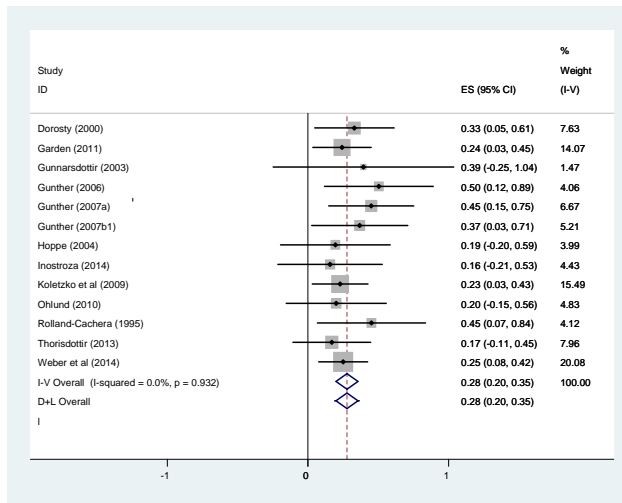
Methods: MEDLINE, EMBASE and CENTRAL databases were searched from January 1988 to June 2015 for studies reporting nutritional intake in infants and preschool children aged 6-36 months and later measures of obesity. Bibliographies of included studies were hand searched and authors and other experts consulted to identify omissions. We included all studies that investigated dietary energy and/or macronutrient intake during 6-36 months in relation to later measures of obesity.

Methodological quality was assessed using the Downs and Black checklist designed specifically to appraise both randomised and non-randomised studies¹. The checklist was adapted to include aspects of particular relevance to studies investigating nutritional exposures. Two reviewers independently scored studies against the 28 item checklist which included questions on study reporting, external validity, internal validity (bias and confounding), and statistical power. A statistician independently scored questions relating to statistical methods and their decision was final. Data from studies amenable to meta-analysis were analysed using STATA (StataCorp 12, Texas). For continuous outcomes, results were expressed as standardised mean difference (SMD) between the high and low protein intake groups. For dichotomous outcomes, results for each study were expressed as relative risk (RR). Both dichotomous and continuous outcomes were presented with 95% confidence intervals (CI). Between-study heterogeneity was assessed by the Q and I^2 statistics.²

Results: 24 eligible articles (comprising 16 primary studies) were included in a narrative synthesis, and 13 studies in a random-effects meta-analysis. A higher protein intake was associated with later risk of obesity in 15 studies. In 13 studies included in the meta-analysis protein in the preschool period was associated with higher BMI z-score later in childhood (pooled effect size: 0.28 z-scores, 95% CI 0.20 to 0.35)(Figure 1). There was no significant heterogeneity between studies (I^2 0.0%, $p = 0.932$).

Associations of energy, fat and carbohydrate were inconclusive.

Figure 1: Protein intake and BMI z-score – pooled effect estimate



Conclusion: Our findings suggest that nutrition and particularly high protein intake in infants and preschool children is important for risk of later obesity. Although further experimental data are required to establish causality, these findings suggest that optimising the protein intake of these children could be important for their long term health.

Disclosure of interest: The authors declare no conflicts of interest.

Reference List

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