A systematic review of the evidence: the effects of portion size manipulation with children and portion education/training interventions on dietary intake with adults

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CRD summary
The authors concluded that curbing development of sensitivity to large portion sizes in young children may result in a healthy weight gain trajectory but further research was needed. The authors’ conclusions are fairly cautious and their recommendations for further research seem appropriate. The evidence base is lacking and does not permit reliable conclusions to be drawn.

Authors’ objectives
To assess the effect of altering food portion sizes on children’s dietary intake and the effectiveness of portion education or training interventions with adults.

Searching
Five electronic databases (including MEDLINE/PubMed and The Cochrane Library) were searched for peer-reviewed articles in English published between 1990 and 2011. Search terms were reported. Reference lists of identified publications were searched manually.

Study selection
Experimental or quasi-experimental studies and systematic reviews of experimental studies were eligible for inclusion. Eligible studies had to assess the effects of varying food portion sizes on well and normally developing children aged less than eight years or evaluate the effects of portion size training interventions with adults of childbearing age. Studies conducted in school settings were excluded from the review. Studies that altered portion sizes of specific nutrients were excluded from the review. Educational interventions conducted in parents were excluded if they did not outline the content of the intervention or specify the outcomes of the intervention other than general nutrition knowledge.

All included studies were conducted in the United States in a laboratory or university setting. Most studies in children were in three to five year olds. Where reported, adults were aged between 17 and 79 years. Studies in children included varying food portion sizes usually given once a week for up to four weeks. Outcome measures varied across studies and included, dietary intake, hunger and liking ratings and children’s bite size.

Studies in adults assessed portion-size measurement aids, including actual food size manipulation or computerised simulation. Intervention sessions lasted 30 minutes or one hour and outcomes were measured immediately post intervention. Outcome measures included portion size accuracy and psychological measures.

Two trained paediatricians screened studies for inclusion.

Assessment of study quality
Two trained paediatricians independently assessed study strengths and limitations based on the reporting of specific study criteria (as reported in the review). Discrepancies were resolved through discussion.

Data extraction
The authors did not state how data were extracted or how many reviewers extracted data.

Methods of synthesis
Study outcomes were presented as a narrative synthesis and in evidence tables.

Results of the review
Nine studies (300 children, 256 adults) were included in the review: one RCT, five crossover designs, one controlled cohort study, a 2x2 within subject design and a pre-post test study. Strengths of the studies included easy study replication, similar aged children and use of multiple outcome measures. Limitations of the studies included single
study site, small sample sizes, laboratory setting and no long term outcome data.

Children: Five studies showed that food portion size had an effect on overall energy intake with larger servings resulting in greater daily energy intake in many children. Two studies measured the age at which portion sizes affect the energy intake of children but did not identify the age at which children override internal self-limiting mechanisms in terms of portion size.

Adults: The three studies in adults indicated that short interactive parent-directed interventions can teach parents to be sensitive to portion sizes and improve accuracy; training through computer models was not found to be effective.

Authors' conclusions
Curbing development of sensitivity to large portion sizes in young children may result in a healthy weight gain trajectory. Further research was needed to understand the effect of parent-focused, portion-education interventions on appropriate energy intake and healthy weight attainment in young children.

CRD commentary
The review question and supporting inclusion criteria were broadly stated. Several electronic databases were searched for relevant articles. The search was restricted by language and publication status so potentially relevant data may have been missed. The authors discussed certain strengths and limitations of the included studies, which suggested potential for risk of bias in the studies. It was unclear how many reviewers extracted data so reviewer error and bias could not be ruled out.

A narrative synthesis was appropriate given the lack of statistical data reported and the nature of the evidence. However, lack of statistical data made it difficult to determine the strength of any associations between the intervention and outcomes. Details on study and participant characteristics were limited but suggested some variability between study methods and outcome measures.

The authors acknowledged some of the limitations of the studies including the uncertainty over the type or palatability of the foods offered to the children and the influence these factors may have had on the findings. Other limitations included short follow-up in adults, small sample sizes and the limited generalisability of the findings to real world contexts. It also appeared that the studies in children included the same groups of authors, which could also limit the generalisability of the findings.

The authors’ conclusions are fairly cautious and their recommendations for further research seem appropriate. The evidence, however, is lacking and does not permit reliable conclusions to be drawn.

Implications of the review for practice and research
Practice: The authors stated that the manner in which parents negotiate the timing of intervening may greatly influence the child's learning of age-appropriate portion sizes and a child's later weight-gain trajectory. Nurses should use a two- or three-dimensional model and plan 30 to 60 minutes of personal interaction (rather than computerised educational) to enhance a parent's ability to estimate portion sizes.

Research: The authors stated a need for more well-designed research to investigate portion interventions in the home environment, identify a balance between interventions and a child's eating behaviour or temperament and investigate the effects of varying portion sizes of different types of food to young children.

Funding
Not stated.

Bibliographic details

PubMedID
22703240
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.