

COMMENTS: The abstract could be clearer - for instance please provide a short definition on metabolically unhealthy obesity is needed. In addition the results section is massive - surely the abstract must be over the word count? Does the conclusion capture the aims?

Meal patterns and risk of childhood obesity and metabolically unhealthy obesity: a systematic review of the evidence, methodological issues and research gaps

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(448/450 words)

Introduction

Childhood overweight/obesity (Ov/Ob) is a major public health problem, of greater concern when accompanied with comorbidities such as hypertension, insulin resistance leading to metabolically unhealthy obesity (MUO). Current evidence suggest a linkage between meal frequency, diet quality and nutritional status^[1-3] in children and adolescents, however data regarding associations between meal patterns, Ov/Ob risk and MUO are limited.

Aim

To explore associations between meal patterns and the risk of childhood Ov/Ob and MUO.

Methods

The PRISMA methodology was used to retrieve prospective studies and randomized controlled trials conducted in children/adolescents 2-19 years old in Europe, USA, Canada or Oceania, from 01/2013 to 06/2023. Exposures considered under the umbrella “meal patterns” included consumption of a meal, meal skipping, timing, format and context. The quality of the studies was assessed with the ROBINS-E and RoB-2 tools.

Results

Of the 3,020 studies initially retrieved, 27 were included. All studies reported on Ov/Ob risk whilst no studies on MUO were identified. All but one study had a longitudinal study design. Risk of bias considered high/very high in twenty-two studies (81%), mainly due to the methods the measures of exposure were assessed. Consumption of/skipping breakfast was the most common exposure (n=), followed by lunch (n=5), dinner (n=5), meal frequency/eating occasion (EO; n=5) and fast foods (n=4). Some studies reported on meal context (eating while watching TV; n=4). In most studies, frequent breakfast and evening family dinners (i.e. 7 days/week vs <7days/week) was associated with lower odds of childhood Ov/Ob, BMI and %body fat at follow-up (FU). Results on skipping breakfast are inconsistent with only four studies suggesting a positive association with obesity markers, whilst a positive association between eating while watching TV and weight trajectories was observed in two studies. No associations were reported in relation to frequency of lunch and fast

food intake. Results regarding meal frequency/EO and Ov/Ob at FU are conflicting, with differences attributed on the definition of an EO.

Conclusion

Limited evidence showed that frequent consumption of breakfast and family dinners may be associated with lower Ov/Ob risk in children and adolescents, while eating in front of TV with increasing weight trajectories. No studies were identified in relation to MUO, highlighting a significant research gap. Nevertheless, clear definition on EOs and improved methodological approach in the assessment of meal patterns emerged as a need, according to current review findings.

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