

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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INTRODUCTION

Although diet is one of the most important modifiable determinants of weight status and health, the role of meal patterns (consumption of / skipping a meal; meal / eating occasion (EO) frequency; meal format, meal context) in the development of childhood overweight/obesity (Ov/Ob) and metabolically unhealthy obesity (MUO) has been insufficiently explored.

AIM

To systematically review evidence of the association between meal patterns and the risk of childhood Ov/Ob and MUO.

METHODOLOGY

- Registration in PROSPERO (CRD42023477708).
- The research questions are presented in **Table 1**.
- Risk of bias was evaluated via the ROBINS-E (Risk Of Bias In Non-randomized Studies) & RoB-2 (Revised Cochrane risk of bias tool for randomized trials) tools.
- Databases: Medline & Scopus.
- Study design: longitudinal prospective studies with ≥ 12 -mo follow-up and randomized controlled clinical trials (RCTs) with ≥ 12 -mo follow-up.
- Study area: Europe, USA, Canada, Oceania.
- Timeframe: 01/01/2013 – 30/06/2023.
- Language: English.

Table 1. Research questions according to the PECO/PICO framework.

| | |
|--|--|
| Population | Children and adolescents 2-19 years old |
| Exposure/ Intervention & Comparator | High vs low eating/meal/snack frequency; early vs late meal timing; low vs high levels of meal omitting; meal context [(alone vs with others, while watching TV vs other activities, at home vs out of home); high vs low meal quality] Interventions targeting meal patterns vs standard care or no intervention |
| Outcome | Ov/Ob and MUO; changes in indicators of Ov/Ob (e.g., BMI) and MUO (e.g., blood lipids) |

RESULTS

- All included reports (n=27; 26 longitudinal, 1 RCT; sample size 116-23,307) investigated Ov/Ob risk; no study on MUO risk was identified (Figure 1).
- Risk of bias was high/very high in 81% (22/27) of the studies, mainly due to the methods measures of exposure were assessed.
- Consumption of/skipping breakfast was the most common exposure, followed by consumption of lunch (n=5), dinner (n=5), meal/eating occasion (EO) frequency (n=5), consumption of fast foods (n=4), and 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) were associated with lower odds of Ov/Ob, BMI and % body fat at follow-up. Four studies also showed that skipping breakfast was associated with increased obesity markers, while three studies showed no associations. There was limited evidence of a positive association between eating while watching TV and weight trajectories (n=2). Results regarding meal/EO frequency and Ov/Ob were conflicting, with differences attributed to the definition of an EO.

CONCLUSION

There is some evidence 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. Lack of prospective studies in MUO, as well as absence of clear definition on EOs, highlight significant research gaps and methodological issues.

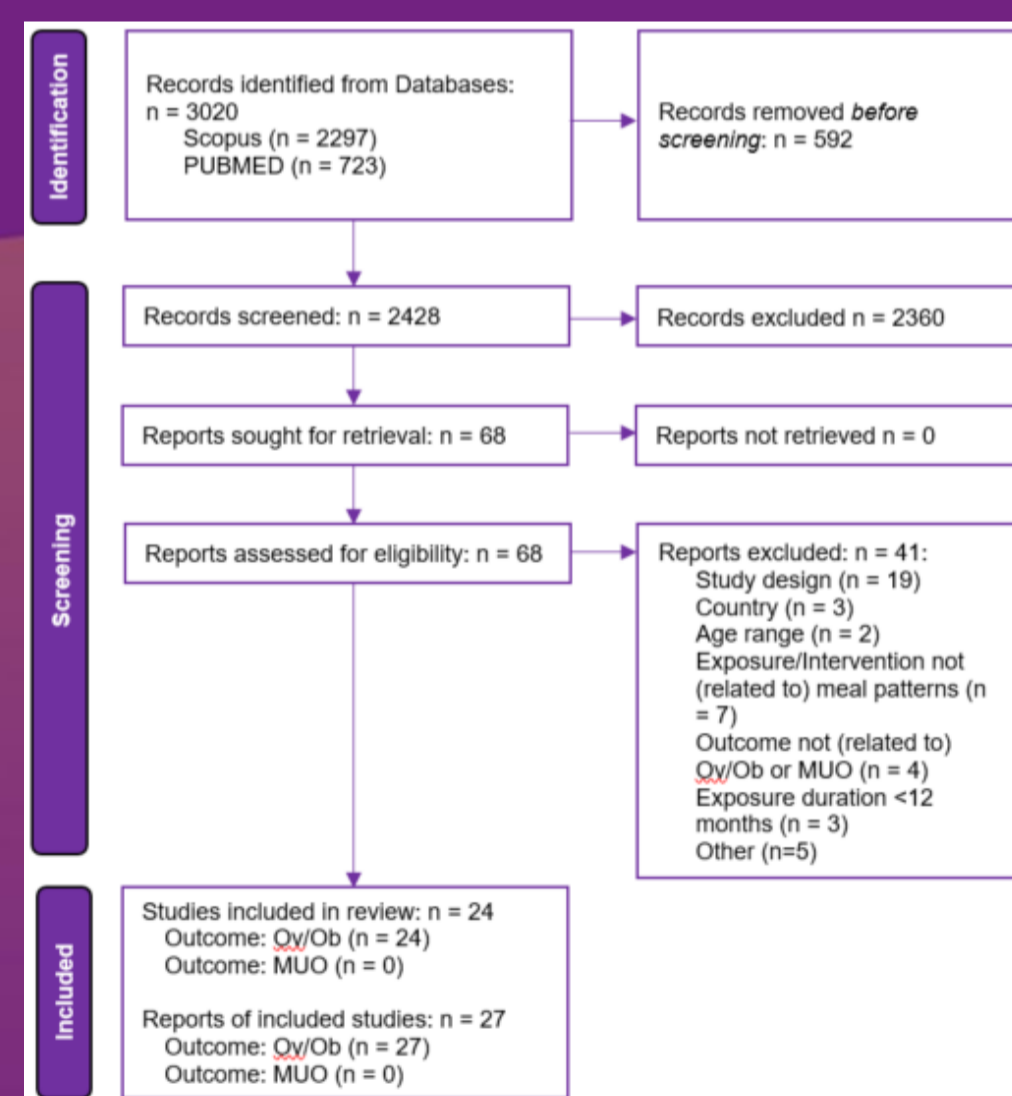


Figure 1. PRISMA flowchart.



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