

The association between maternal preconception BMI and early childhood nutrition

Kate E. Braddon^{1,3}, Charles D.G. Keown-Stoneman^{2,3}, Cindy-Lee Dennis³, Jonathon L. Maguire^{2,3}, Deborah L. O'Connor^{1,3}, and Catherine S. Birken^{1,3} for the TARGet Kids! Collaboration

The Hospital for Sick Children¹, St. Michael's Hospital² and University of Toronto³

INTRODUCTION

- Eating behaviours and food preferences developed early on in life have shown to **sustain into later life**.
- Risk factors** for child development of obesogenic eating behaviours and food preferences are thought to begin during the preconception period.
- It is unknown** if maternal preconception BMI is associated with child nutritional risk in early childhood.

OBJECTIVES

- To determine whether maternal preconception BMI is associated with child nutritional risk, eating behaviours and dietary intake in children ages 18 months to 5 years.
- To determine if household income and child age modify any of the above associations.

METHODOLOGY

- Study design:** Prospective longitudinal cohort study.
- Study population:** Children ages 18 to 72 months who were recruited from The Applied Research Group for Kids (TARGet Kids!), a primary care practice-based research network enrolling healthy children and their parents in Ontario and Quebec.
- Exposure:** Preconception maternal BMI.
- Outcomes:** Parent-reported child nutritional risk score, eating behaviour sub-score and dietary intake sub-score with repeated measures using the NutriSTEP™, an age-appropriate validated questionnaire.
- Effect modifiers:** Child age and household income.
- Statistical analysis:** Linear mixed effects models were fitted adjusting for the confounders: maternal age, maternal ethnicity, parity, household income, and child age and tested effect modifiers.

RESULTS

Table 1. Baseline Characteristics (N=4733)

Variable	Preconception BMI Weight Status Groups		
	All BMI	Underweight/ Normal n=3460 (73.1%)	Overweight/ Obese n=1273 (26.9%)
Child sex (Male)	2448 (51.7%)	1773 (51.2%)	675 (53.0%)
Child age at outcome, mo	35.25 ± 14.5	35.63 ± 14.4	34.24 ± 14.7
NutriSTEP total score	13.8 ± 6.4	13.4 ± 6.3	14.8 ± 6.7
Mother Age, yr	33.52 ± 4.5	33.52 ± 4.4	33.53 ± 4.8
Preconception BMI	23.6 ± 4.4	21.5 ± 1.9	29.0 ± 4.4

Table 2. Repeated measure NutriSTEP observations.

Variable	NutriSTEP		
	All (n=8611)	Toddler (n=2649)	Preschooler (n=5962)
Total Score	13.5 ± 6.2	12.0 ± 6.0	14 ± 6.0
Low Risk	7461 (86.6%)	2382 (89.9%)	5079 (85.2%)
High Risk ¹	1150 (13.4%)	267 (10.1%)	883 (14.8%)

¹High(nutritional) risk included any NutriSTEP score ≥ 21.

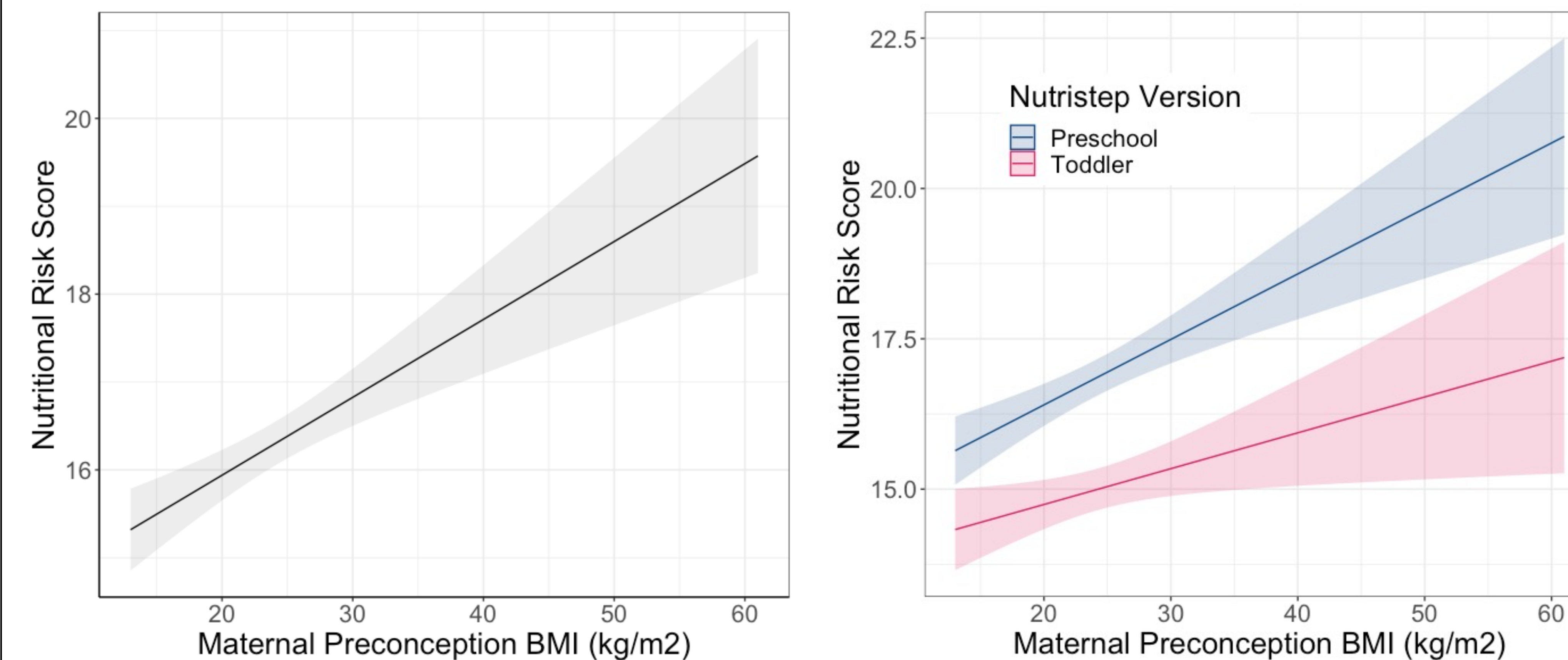


Figure 1. Primary Analysis: Association between maternal preconception BMI and child nutritional risk (adjusted for maternal age, maternal ethnicity, parity, household income and effect modification of child age). Non stratified model (left), stratified model by child age (toddler < 36 months, preschooler ≥ 36 months) (Right).

Table 3. Linear Mixed Effects analysis for maternal preconception BMI and NutriSTEP.

Outcome Variable	Adjusted β (95 % CI) ¹	P-value
NutriSTEP total score		
Both (n=8611)	0.09 (0.05, 0.12)	<0.001
Toddler (n=2649)	0.06 (0.008, 0.11)	0.024
Preschooler (n=5962)	0.11 (0.07, 0.15)	<0.001
Eating Behaviour		
Toddler (n=2649)	0.02 (-0.008, 0.05)	0.17
Preschooler (n=5962)	0.03 (0.02, 0.05)	<0.001
Dietary Intake		
Toddler (n=2649)	0.02 (-0.006, 0.04)	0.14
Preschooler (n=5962)	0.05 (0.03, 0.07)	<0.001

¹Results are displayed at mean age for the group.

CONCLUSION

- Higher preconception maternal BMI is associated with higher child nutritional risk.
- This work provides evidence that the preconception period may be an effective intervention time for targeting outcomes in early child nutrition.
- Future work is required to investigate the mechanism behind this association to better understand how to best design interventions.

ACKNOWLEDGEMENTS

Contact Kate:
Email: kate.braddon@mail.utoronto.ca

