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Heterogeneity in Early Postoperative Dietary Changes after Metabolic-Bariatric Surgery and their Relationship with 12- Month Cognition

TORONTO2026

The Future of Obesity Management:
From Weight Loss to Health Gain

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Disclosure Slide

Nothing to disclose

☒	No, nothing to disclose
☐	Yes, please specify:



Nutritional Status Pre- and Post-MBS

Nutritional Status: An individual's health status based on the intake and utilization of dietary nutrients

Micronutrient deficiencies

- Vitamin D, B₁₂, Iron, Folate
- ↑ risk in females, ↑ baseline BMI, and specific ethnic groups

Pre-Surgery



Micronutrient deficiencies

- Can result in anemia, osteoporosis, neuropathy

Post-Surgery



Cognitive Function Post-MBS

- Improvements in **memory** and **executive functions** have been found 3 months to 3 years following MBS
- Mechanisms behind these improvements are not well understood
- **Optimal nutrient intake** may be associated to cognitive improvements



Objectives

1. Describe **changes** in **dietary clusters** from 3-months pre- to 6-months post- MBS, in terms of **macronutrient** and **micronutrient intake**, in patients undergoing a primary MBS
2. Assess how these changes in dietary clusters were associated with **cognition** 12 months post-MBS



Results – Participant Characteristics

- **Longitudinal** sub-study of EMBRACE (trial registration NCT05318781; REB# MP-32-2022-2412)
- **Twenty-seven** participants undergoing a primary MBS (SG or RYGB)
- Recruited at the Centre intégré universitaire de santé et de services sociaux du Nord-de-l’Île-de-Montréal (CIUSSS-NIM)

Demographics		Total Participants (N=27)	Cluster 1 (N=5)	Cluster 2 (N=22)
Sex [% (N)]	Female	75% (18)	40% (2)	84% (16)
	Male	25% (6)	60% (3)	16% (3)
Age (years)	-	50.92 ± 10.35	54.60 ± 12.74	50.48 ± 9.53
BMI (kg/m ²)	-	46.14 ± 7.92	42.24 ± 5.96	45.71 ± 7.37
Fat percentage (%)	-	50.30 [47.2, 53.0]	50.80 [48.2, 51.2]	50.55 [47.2, 53.4]
Waist circumference (cm)	-	142.50 [125.5, 149.5]	148.50 [148, 154]	138.0 [126, 147]
Waist-to-height ratio	-	0.82 ± 0.09	0.81 ± 0.10	0.82 ± 0.04

Values are expressed as mean ± SD, unless otherwise indicated



Results – Objective 1: Describing Dietary Clusters



Cluster analysis

- Calculated the **change** in dietary intake from 3 months pre- to 6 months post-MBS
- **PROC STDIZE → FASTCLUS** procedure using k-means method → Pseudo F statistics & cubic clustering criterion

Cluster 1 (N=5): High caloric diet

↑ Energy intake, all macronutrients and micronutrients, Simple sugars, Fatty acids, dietary fiber 6-months following MBS

Cluster 2 (N=22): Low energy, protein, fat diet

↓ Energy intake, protein, fat, sodium, magnesium, calcium, phosphorus, vitamin B6, vitamin D, zinc, simple sugars, and fatty acids 6-months following MBS



Results – Dietary Clusters and Cognition

12M post-MBS ANCOVA Analyses

Cognitive Variables	Cluster 1	Cluster 2	F-statistic (p-value)	Effect Size
Executive Function	-0.45 ± 0.20	-0.06 ± 0.15	1.19 (0.31)	-0.88
Global Cognition	-0.06 ± 0.16	-0.05 ± 0.11	3.53 (0.10)	-0.06
Memory	-0.03 ± 0.29	0.02 ± 0.20	3.01 (0.12)	-0.07
Processing Speed	0.40 ± 0.19	-0.03 ± 0.14	1.01 (0.34)	1.14

All models were **adjusted** for age, sex, ethnicity, marital status, years of studies, gross income, physical activity and baseline BMI

*Statistically significant ($p < 0.05$)



Conclusion & Future Research

- Suggests variability in nutrient-level dietary clusters in candidates for MBS
- Larger effect sizes suggest a potential relationship between post-operative dietary changes and cognition, despite non-significant findings
- **Future studies**
 - Assess changes between dietary clusters pre- and post-MBS in a larger sample size
 - Integrating metabolic & gut microbiome data may clarify potential mechanisms underlying diet-cognition associations
 - Compare dietary clusters with a control group





- Collaborators
 - Kim Lavoie, PhD
 - Patients
 - HCPs / administrators
- Staff and students

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