PROFILING MATERNAL LIFESTYLE FACTORS AND GESTATIONAL WEIGHT GAIN: A CORRESPONDENCE ANALYSIS

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Introduction

Gestational weight gain (GWG) is fundamental during the prenatal period, as it plays a crucial role in the health of the expecting mother and the developing baby [1]. Existing literature has shown that pre-pregnancy BMI [1,2], maternal smoking habits and physical activity (PA) level [1,3], educational level [4], smoking habits [5], adherence to a balanced diet [2] and other lifestyle factors[6] have a great impact on GWG.

Objective

To explore the profile of maternal lifestyle factors and gestational weight gain using the baseline data of the LIMIT prospective cohort

Methods

A correspondence analysis was conducted using baseline data from the ongoing LIMIT (Lifestyle and Microbiome Interaction Early Adiposity Rebound in Children) prospective cohort project [7]. 162 subjects without missing data for maternal characteristics under study was enrolled yielding 2,106 observations in 37 rows and 3 columns. Statistics were reported for row and column categories in row principal normalization.

Results

The two axes (Figure 1) explained the total variability of the data, where the horizontal and vertical axis accounted for 63.4% and 36.6% of the total/cumulative inertia, respectively. The prevalence of mothers with a lower or high school level of education, who smoke during pregnancy, consume more than 1.5 portions of meat and milk per day, have an inadequate daily consumption of vegetables and fruit, lower Mediterranean diet adherence scores with Excess GWG is higher than the average profile, while mothers with lower physical activity and Mediterranean diet adherence scores are lower than the average profile. On the other hand, the prevalence of those who did not smoke during pregnancy, who consume an average of weekly legume and daily cereals has an almost similar average profile with EGWG. Mothers who are being underweight during pre-pregnancy with LGWG has an almost similar profile to the average. While mothers with low GWG have a lower prevalence of a lower or high school educational level, medium mediterranean diet adherence scores, an overweight or obese pre-pregnancy BMI, and inadequate daily fruit consumption compared to the average profile. Mothers with Average GWG have an average profile almost similar to that of mothers who do not smoke during pregnancy, engage in average physical activity, consume an average daily consumption of fruit and one to one and a half portions of milk and dairy products per day. Mothers with AGWG and LGWG show almost similar profile with mothers consuming inadequate daily cereal.

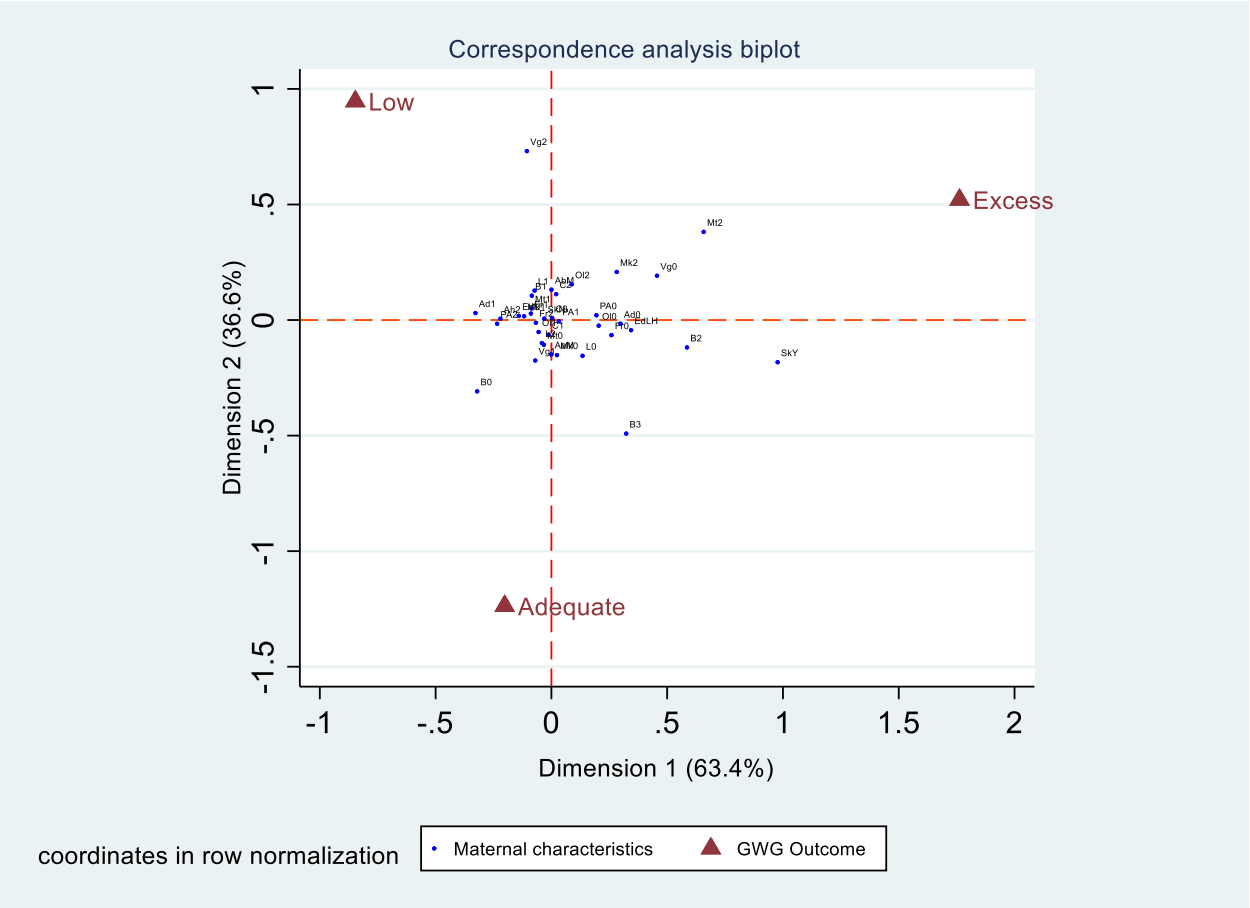

Figure 1 Correspondence plot for profiling maternal lifestyle by Gestational Weight Gain outcome
[AbM - Below Mean Age, AaM - Above Mean Age, EdLH - Lower or High School, EdU - University degree, SkN - Smoker during pregnancy, SkY - No Smoking during pregnancy, B0 - Underweight , B1 – Normal, B2 – Overweight, B3 – Obesity, PA0 – Lower Physical Activity score, PA1 – Medium Physical Activity score, PA2 – Higher Physical Activity score, Ad0 – Lower Adherence to MD Score, Ad1 - Medium Adherence to MD Score, Ah2 - Higher Adherence to MD Score, Fr0 – Inadequate daily fruits consumption, Fr1 – Average daily fruits consumption, Fr2 – Adequate daily fruits consumption, Vg0 – Inadequate daily vegetables consumption, Vg1 – Average daily vegetables consumption, Vg2 – Adequate daily vegetables consumption, L0 – Inadequate weekly legumes consumption, L1 – Average weekly legumes consumption, L2 – Adequate weekly legumes consumption, C0 – Inadequate daily cereals consumption, C1 – Average daily cereals consumption, C2 – Adequate daily cereals consumption, Mt0 - Less than 1 portion daily meat product consumptions, Mt1 - 1 to 1.5 portion daily meat and meat product consumptions, Mt2 - >1.5 portion daily meat and meat product consumptions, Mk0 - Less than 1 portion daily milk and milk product consumptions, Mk1 - 1 to 1.5 portion daily milk and milk product consumptions, and Mk2 - >1.5 portion daily milk and milk product consumptions]

Conclusions

Correspondence analysis shows a fundamental difference in the profile of maternal characteristics compared to the average profile with GWG outcomes (AGWG, EGWG and LGWG). Maternal characteristics were described as having a lower or higher prevalence than the average profile.

Bibliography

[1] KM, R., & AL, Y. (2009). Weight Gain During Pregnancy: Reexamining the Guidelines-Background. https://doi.org/10.17226/12584

[2] Suliga, E., Rokita, W., Adamczyk-Gruszka, O., et al.. (2018). Factors associated with gestational weight gain: A cross-sectional survey. *BMC Pregnancy and Childbirth*, *18*(1), 1–11. https://doi.org/10.1186/S12884-018-2112-7/TABLES/4

[3] Harrison, C. L., Bahri Khomami, M., Enticott, J., et al. (2023). Key Components of Antenatal Lifestyle Interventions to Optimize Gestational Weight Gain: Secondary Analysis of a Systematic Review. *JAMA Network Open*, *6*(6), E2318031. https://doi.org/10.1001/JAMANETWORKOPEN.2023.18031

[4] O'Brien, E. C., Segurado, R., Geraghty, A. A., et al.. (2019). Impact of maternal education on response to lifestyle interventions to reduce gestational weight gain: individual participant data meta-analysis. *BMJ Open*, *9*(8). https://doi.org/10.1136/BMJOPEN-2018-025620

[5] Suzuki, M., Wakayama, R., Yamagata, Z., & Suzuki, K. (2022). Effect of maternal smoking during pregnancy on gestational weight gain and birthweight: A stratified analysis by pregestational weight status. *Tobacco Induced Diseases*, *20*(1 January). https://doi.org/10.18332/TID/143952

[6] Institute of Medicine (US) and National Research Council (US) Committee to Reexamine IOM Pregnancy Weight Guidelines; Rasmussen KM, Yaktine AL, editors. W. (DC): N. A. P. (US); (2009). *Weight Gain During Pregnancy: Reexamining the Guidelines - Chapter 4: Determinants of Gestational Weight Gain - Weight Gain During Pregnancy - NCBI Bookshelf*. https://www.ncbi.nlm.nih.gov/books/NBK32811/

[7] De Giuseppe, R., Loperfido, F., Cerbo, R. M., et al. (2022). LIMIT: LIfestyle and Microbiome InTeraction Early Adiposity Rebound in Children, a Study Protocol. *Metabolites*, *12*(9). https://doi.org/10.3390/METABO12090809