Associations between maternal nutritional status, haemodynamic parameters and delivery outcomes in low-risk pregnancies: a prospective observational study

Chiara **Lubrano** [1,2,*], Francesca **Parisi** [1,2], Chiara **Coco** [1,2], Elisabetta **Marelli** [1,2], Eleonora **Burello** [1,2], Irene **Cetin** [2,3]

[1] Department of Woman, Mother and Child, Luigi Sacco and Vittore Buzzi Children Hospitals, ASST Fatebenefratelli-Sacco, Università degli Studi di Milano, Milan, Italy.
[2] Department of Biomedical and Clinical Sciences, Università degli Studi di Milano, Milan, Italy.
[3] Department of Mother, Child and Neonate, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy.

DOI: 10.36129/jog.2024.S45

Objective. Cardiovascular adaptations represent the most relevant physiological changes of the maternal body during pregnancy, ensuring adequate utero-placental blood perfusion for intrauterine growth and development. Additionally, maternal nutritional status represents a pivotal predictor of pregnancy outcomes.

Materials and Methods. This prospective observational study investigates the associations between maternal characteristics and nutritional habits at term, haemodynamic parameters, and pregnancy outcomes. Healthy women with singleton uncomplicated pregnancies were enrolled at 36-41 gestational weeks. At enrolment, a nutritional score (0-10) based on ten questions with binary yes/no answers was calculated to quantify maternal adherence to a healthy diet and lifestyle. Maternal haemodynamic parameters were assessed by using the Ultrasonic Cardiac Output Monitor (USCOM), including cardiac output (CO), systemic vascular resistance (SVR) and Smith-Madigan inotropy index (SMII). Pregnancy outcomes were recorded at delivery. Associations between maternal characteristics and nutritional score, haemodynamic parameters, and pregnancy outcomes were investigated by using multi-adjusted generalized linear models.

Results. 143 pregnancies were enrolled. Pregestational body mass index was positively associated with SVR ($\beta = 43.16$, $p < 0.001$) and negatively associated with CO ($\beta = -0.07$, $p < 0.001$) and SMII ($\beta = -0.02$, $p = 0.02$). Additionally, a positive association was detected between the nutritional score and SMII ($\beta = 0.05$, $p = 0.005$). Finally, CO was positively associated with birth ($\beta = 7.48$, $p = 0.05$) and placental ($\beta = 44.27$, $p < 0.01$) weight, while RVS showed a negative association with birth ($\beta = -0.01$, $p = 0.02$) and placental ($\beta = -0.06$, $p = 0.02$) weight.

Conclusions. This study shows that maternal derangements in nutritional status and habits are associated with a compromised haemodynamic profile at term, with additional impact on intrauterine growth.