Plasma Polyunsaturated Fatty Acids Profile in Normal Weight, Overweight and Obese Pregnant Women and Offspring at Birth

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The n-6 and n-3 polyunsaturated fatty acids (PUFAs) are essential for optimum fetal growth and development. During pregnancy, an adequate maternal intake of these nutrients, especially the long-chain n-3 PUFAs docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA), promotes the optimal development of the fetal brain and immune system. The n-6 and n-3 long-chain PUFAs (LC-PUFA) that the fetus accumulates in utero are derived predominantly through placental transfer, with the amounts in cord blood influenced by the maternal diet. DHA, a major component of the developing central nervous system, is essential for cognitive and visual functions. Arachidonic acid (AA) is a membrane component and a precursor to potent signaling molecules, such as prostaglandins and leukotrienes.

This study comprised 83 pregnant women participants in the PREOBE Study (Clinical Trials Identifier: NCT01634464), aged 17-44 years and classified depending on their Body Mass Index (BMI). Fifty nine percent of pregnant women were normoweight (18≥BMI<25), 24% overweight (25≥BMI<30) and 17% obese (BMI≥30). Plasma phospholipids fatty acids were determined at 24, 34 and 40 weeks of gestation and newborns by fast gas chromatography.

The weight gained by mothers during pregnancy was adequate (normal weight 13.92 Kg, overweight 10.01 Kg and obese 7.13 Kg). There was no difference between anthropometric indicators of growth in children at birth. Overweight and obese pregnant women had lower levels of EPA than normal weight pregnant women at 24 weeks of gestation. The LC-PUFA (sum of EPA and DHA) were negatively correlated with the BMI before pregnancy and at the end of gestation. However, PUFA levels of children were similar between the groups. Comparing the PUFA levels between mothers and offspring in all groups, we found that C18:2 n-6, C18:3 n-3 and EPA were lower in children. On the other hand, children had higher levels of C18:3 n-6, C20:3 n-6, AA, C22:4 n-6, C22:5 n-6 and DHA than their mothers.